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Reports of
The Princeton University Expeditions to Patagonia, 1896-1899

J. B. HATCHER in Charge

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Part I. Mammalia of Southern Patagonia

BY

J. A. ALLEN

AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK

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Vol 3 Zoology.

Dr. E. A. Mearns,
with kind regards of
J. A. Allen

PART I.

MAMMALIA OF SOUTHERN PATAGONIA.

BY

J. A. ALLEN,

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INTRODUCTION.

THE area covered by the present report includes that portion of Argentina situated south of south latitude 40°, Tierra del Fuego, and the southern part of the Chilian Territory of Magellan, or that portion of it lying west of Tierra del Fuego. The main Andean chain thus forms the western boundary. Its basis is primarily the collections made by the Princeton Expeditions, gathered mainly in the Territory of Santa Cruz, to which material it was intended at first to restrict the report. Later it seemed desirable to extend the scope to include what seems to be a fairly well marked faunal region. Finally, to impart to it something of the character of a monograph, and perhaps thus add to its usefulness, it was decided to include not only full bibliographical references, but also, in most instances, descriptions of the species, and such accounts of their life histories as could be conveniently brought together, including especially the field notes of the collectors.

The Princeton Expedition's collections of mammals were made partly on the coast, and partly in the interior at the eastern base of the Andes, by O. A. Peterson in 1897, and Mr. E. A. Colburn in 1898, and aggregate about 600 specimens. A few specimens collected by Mr. Barnum Brown in 1899, and by him presented to the American Museum of Natural History, and various specimens belonging to the U. S. National Museum have also been utilized, while great assistance has been derived from the examination of the material from this and adjoining parts of South America in the British Museum.

Mr. Peterson's collection[1] numbers about 370 specimens, of which 134 — 70 large mammals, and 64 small mammals — were taken along the coast, at different points from the Rio Gallegos to the Rio Coy, from May 13 to November 29, of which the greater part were collected in July and August, and are thus in midwinter pelage. They include a large series of the Guanaco and Gray Fox, and about 64 Rodents of various species. The remaining, and by far the larger part of the collection (about 240 specimens), was made on the headwaters of the Rio Chico de Santa Cruz, at the eastern base of and in the Cordilleras, including a few from the Pacific Slope. These embrace a small series of the Chilian Deer or Guamul, the rest being Rodents, which number nearly 20 species. The Cordilleras collection was made January 31 to March 6, and hence consists of midsummer to early fall specimens, and they are thus not satisfactorily comparable with the coast series. The coast series, however, fortunately contains, in several instances, summer and winter specimens of the same species, showing the quite different pelages of the two seasons. The Peterson collection was purchased by Dr. C. Hart Merriam for the Biological Survey, and now forms part of the collection of the U. S. National Museum.

Mr. Colburn's collection consists of about 200 specimens, of which 18, representing five species, were taken at Punta Arenas during the first week in January; and 10 were taken near Port Desire (labelled "Mount Observation"), February 21–23, and represent three species. Then followed a continuous journey of some 250 miles up the Rio Chico de Santa Cruz, to the mouth of the Rio Belgrado, during which no specimens of mammals appear to have been collected, and only a few (about 25) were taken on the way north from the Rio Belgrado to the vicinity of Lake Buenos Aires.[2] During the month of April work was prosecuted continuously at camps in the Basalt Cañons, a pampa country having an altitude of about 3,000 feet. A few specimens were collected near Swan Lake, some fifty miles to the southward, in March, but none were taken after May 15, during the return journey to the coast. Hence nearly all of the 200 specimens collected by Mr. Colburn were taken in March, April, and the first half of May, or during the season corresponding to fall in northern latitudes, and in the elevated pampa country, at the eastern base of the Andes, between the mouth of Rio Belgrado and Lake Buenos Aires. This collection is the property of the Princeton University, except a series of the duplicates which has been presented to the American Museum of Natural History.

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[1] While Mr. Peterson was charged with the collecting of the recent material, it should be noted that Mr. Hatcher at all times coöperated with him in the work, and that many of the specimens were collected by him. (See Hatcher, Narrative of the Expedition, pp. 62, 65, 138, 144.)

[2] Most of the specimens are labelled "Arroyo Eche" (= Aike) a locality not indicated on maps nor even mentioned in Mr. Hatcher's Narrative of the expedition, but which he has kindly located for me as covering the Basalt Cañons and Swan Lake localities, the dates on the labels indicating to which they refer. While Mr. Colburn's specimens are well made, and are accompanied by measurements, indication of sex and date of collecting, he informs me that he "took no field notes." Besides this, about one third of the skulls are unavailable for study, owing either to their actual loss or to the loss of their labels, or to illegibility of the labels due to soiling from lack of care in the preservation of the skulls.

The coast material is especially important as containing practically topotypes of a number of Waterhouse's species of Muridæ, based on specimens collected by Darwin during the voyage of the "Beagle." The sub-Andean series represents a wholly new field, and, as might be expected, contains forms allied, on the one hand, to species previously known only from Tierra del Fuego, and on the other, to species described from Mendoza, nearly a thousand miles to the northward. A number of these prove to be new, though not widely different, respectively from their northern or southern allies.

In attempting to work up this material — the first collection of mammals of any magnitude ever received in this country from Patagonia — it was recognized at the outset that it would be of the utmost importance to make direct comparison of the species represented in it with the types and other authentic material from the same general region contained (almost exclusively) in the British Museum, in which are the types of Bennett's and Waterhouse's species, described more than a half century ago, and the types of Thomas's more recently described species from northern Argentina and Paraguay. Accordingly a good series of specimens was taken to London during the summer of 1901, and through the kindness and cordial assistance of Mr. Oldfield Thomas, Curator of Mammals at the British Museum, I was able to make the necessary critical comparisons with the historic material relating to South American Mammalogy contained in this great Museum. Following the custom of earlier days, the Bennett and Waterhouse types were exhibited for many years as mounted specimens, and thus through long exposure to light suffered much deterioration, but they are still, of course, invaluable as standards of reference.

In the present report only such species are included as have been definitely recorded from within the geographical limits of the region here under consideration. Possibly a few already recorded have been overlooked. However that may be, doubtless many described from points further north will be found to extend into it, and probably some, not here included, described from the coast district of southern Chili, will be found to extend southward and eastward into Patagonia.

As very few of the species of this region have been adequately figured, as regards the skull and dentition, advantage is taken of the present opportunity to publish illustrations of the cranial and dental characters of a considerable number of species, particularly among the Rodents, to serve as standards of comparison in considering allied forms.

As regards the general facies of the Patagonian land mammal fauna, the paucity of types is noteworthy, due to the high southern latitude of the region. It is of course far beyond the range of monkeys and marsupials, while bats, of one or two species, barely reach its northern border. The families Leporidæ, Dasyproctidæ, and Sciuridæ are absent, and the Ruminants are represented by the Guanaco, this region being its metropolis, and by a single species of deer. The Mustelidæ are represented by three genera, *Conepatus*, *Lyncodon*, and *Lutra*, while the Canidæ and Felidæ have each several species. A single species of Armadillo is found as far south as the Rio Santa Cruz. There are two representatives of the Caviidæ, and the family Chinchillidæ is represented by one of its three genera. The abundant genus *Ctenomys* alone represents the Octodontidæ; but the region may be said to be the headquarters of the Murine genera *Reithrodon* and *Euneomys*. Its other characteristic genera of Muridæ are *Akodon*, *Oxymycterus*, *Phyllotis*, and *Eligmodontia*, while the wide ranging genus *Oryzomys* has here a few outlying species. The only murine genus peculiar to the region is *Notiomys*, known thus far by a single specimen taken near Santa Cruz, nearly twenty years ago, by the French Mission Scientifique du Cap Horn.

The shores and outlying islands of Patagonia were formerly great resorts of antarctic types of Pinnipedia, representatives of which still exist, but in greatly reduced numbers, including of the Otariidæ, the genera *Otaria* and *Arctocephalus*, and of the Phocidæ the genera *Mirounga*, *Hydrurgus*, *Leptonychotes* and *Lobodon*.

During the preparation of this work several new forms have been discovered among the Rodents, and several changes of nomenclature in other groups proved imperative, and have been made known in advance of the publication of the completed work. The following papers have therefore been the outgrowth of the present undertaking.[1]

In this connection my thanks are especially due to Dr. C. Hart Merriam, who kindly turned over to me the whole of the Peterson Collection of Mammals for elaboration; to Professor W. B. Scott of Princeton University, at whose solicitation this work was undertaken, for superintending the preparation of a large part of the drawings for the illustrations here presented, and for seconding in every way my efforts to secure a satisfactory presentation of the results of my work; to Mr. J. B. Hatcher for an early transcript of his field notes (since published in his narrative, to which they are herein duly credited); to Mr. Barnum Brown, who accompanied the Princeton Patagonian Expedition of 1899, for important field notes, a few specimens, and much verbal information about the country;

[1] 1901. New South American Muridæ and a new Metachirus. *Bull. Am. Mus. Nat. Hist.*, XVI, pp. 405–412, Nov. 30, 1901.

Eligmodontia morgani, sp. nov. (p. 409), Patagonia.

1901. The proper generic names of the Viscacha, Chinchillas, and their Allies. *Proc. Biol. Soc. Washington*, XIV, pp. 181, 182, Dec. 12, 1901.

On the relation of the generic name *Callomys* D'Orb. & Geoff.

1901. Note on the names of a few South American Mammals. *Proc. Biol. Soc. Washington*, XVI, pp. 183–185, Dec. 12, 1901.

The specific name *ciliatus* Fischer (1814) shown to antedate *patagonicus* Desmarest (1819) for the Armadillo of southern Patagonia.

1902. The Generic and Specific Names of some of the Otariidæ. *Bull. Am. Mus. Nat. Hist.*, XVI, pp. 111–118, March 15, 1902.

Otaria byronia (Blainville) adopted for the Southern Sea Lion, and discussion of its synonymy.

1902. A further note on the name of the Argentine Viscacha. *Proc. Biol. Soc. Washington*, XV, p. 196, Oct. 10, 1902.

Oken, instead of Schinz, shown to be the authority for the name *Viscaccia*, and the specific name of the Viscacha to be *chilensis* Oken instead of *maximus* Desmarest.

1902. Mammal names proposed by Oken in his "Lehrbuch der Zoologie." *Bull. Am. Mus. Nat. Hist.*, XVI, pp. 373–389, Oct. 11, 1902.

The generic name *Viscaccia* carried back from Schinz (1825) to Oken (1816), and *chilensis* Oken (1816) shown to have priority over *maximus* Desmarest (1817), for the Viscacha of Azara.

1903. Descriptions of New Rodents from Southern Patagonia, with a Note on the Genus *Euneomys* Coues, etc. *Bull. Am. Mus. Nat. Hist.*, XIX, pp. 185–196, May 9, 1903.

Ctenomys robustus, *C. sericeus*, *C. colburni*, *Oxymycterus microtis*, *Reithrodon cuniculoides obscurus*, *R. hatcheri*, and *Euneomys petersoni*, spp. et. subsp. nov.

to Mr. Oldfield Thomas, of the British Museum, for free access to the collections under his charge, and for much valuable assistance.

Subclass EDENTATA.

Order DASYPODA.

Of the Edentates, so numerously represented in tropical America, only the Armadillos reach Patagonia, and of these only a single species is represented in the collections made by the Princeton University Expeditions; and this finds its southern limit of distribution at the Rio Santa Cruz. A second species of Armadillo, *Tatu hybridus* (*Dasypus hybridus* Desm.), is recorded from northern Patagonia, and is said to extend as far south as to the Rio Negro, which region, however, is outside of the geographic limits assigned to the present report.

Not only are the Sloths (Bradypodidæ) and the Anteaters (Myrmecophagidæ) absent from the existing fauna of Patagonia, but, according to Professor Scott, no trace of them has yet been found in the Santa Cruz beds, in which Armadillos are represented in such great abundance and diversity. This seems to show, as stated by Scott, that the true Sloths and Anteaters "must have originated in some other part of the South American Continent and were prevented by climatic or other barriers from extending their range into Patagonia."[1]

The majority of the Armadillos of the Santa Cruz beds "belong to extinct lines," which for the most part "are not known to pass beyond the limits of the Santa Cruz formation." To quote from Professor Scott (*l. c.*, p. 8) in respect to the relationship of the extinct to the modern forms, he says:

"Attention has already been called to the difference between the Santa Cruz and the recent Armadillos, a difference which can be made clear in a few words. No probable forerunner of *Dasypus*, *Priodontes*, *Tolypeutes*, *Chlamydophorus*, or *Tatu*, has been found in these beds, though some one of the species of *Prozaëdius* was almost certainly an ancestor of the recent *Zaëdyus*, and it is possible, though far from certain, that some species of *Stenotatus* stood in the same relation to the modern *Cabassous*. In view of the stage of differentiation attained by the Santa Cruz Armadillos, it is most improbable that all these modern types should have originated since that period. This confirms the conclusion indicated by several other mammalian series, that in Miocene times Patagonia was not the principal theatre of evolution of the South American fauna. This would explain the entire absence from the Santa Cruz beds of many types which would naturally be expected to occur there."

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[1] Reports Princeton University Exped. Patagonia, Vol. V, Part I, 1903, p. 4.

FAMILY *DASYPODIDÆ*.

Genus ZAËDYUS Ameghino.

Zaëdyus Ameghino, Contr. al Conoc. Mamm. fos. Rep. Argent., 1889, 867. Type, *Dasypus minutus* Desmarest.

Dasypus, Auct., part.

Euphractus, Auct., part.

ZAËDYUS CILIATUS (Fischer).

(Plates I, Animal ; II, Skeleton ; III, Skulls.)

Tatou pichiy Azara, Quad. Paraguay, II, 1801, 192.

Dasypus ciliatus G. Fischer, Zoognosia, III, 1814, 127. Based on "le tatou pichiy Azara."

Zaëdyus cilliatus Allen, Proc. Biol. Soc. Wash., XIV, 183, Dec. 12, 1901 ("*cilliatus*" in error for *ciliatus*).

Dasypus patagonicus Desmarest, Nouv. Dict. d'Hist. Nat., XXII, 1819, 491. Based on "le tatou pichiy, Azara."

Dasypus minutus Desmarest, Mamm., ii, 1822, 371. Based on "le tatou pichiy ou tatou septième" of Azara, and hence = *Dasypus patagonicus* Desm., 1819.—Fischer, Syn. Mamm., 1829, 393.—Waterhouse, Voy. Beagle, Mamm., 1839, 93, notes on distribution and habits by Darwin.—Turner, P. Z. S., 1851, 214.—Wagner, Schreber's Säug. Suppl., IV, 1844, 177; V, 1855, 176.—Cassin, U. S. Expl. Exp. (Wilkes), Mamm. and Orn., 1858, 54, Rio Negro, Patagonia.—Prichard, P. Z. S., 1902, I, 277; Through Patagonia, 1902, 40, 67, 248 (distribution), 258.

Tatusia minuta Lesson, Man. de Mamm., 1827, 312.—Gray, Mamm. Br. Mus., 1843, 190.—Gerrard, Cat. Bones Mamm., 1862, 286.

Dasypus (*Euphractos*) *minutus* Burmeister, Reise durch die La Plata-Staaten, II, 1861, 427.

Euphractus minutus Gray, P. Z. S., 1865, 377, fig. skull.

Dasypus (*Tatusia*) *minutus* Burmeister, Desc. phys. Rép. Argent., III, 1879, 440.

Zaëdyus minutus, Ameghino, Contr. al Conoc. Mam. fós. Rep. Argent., 1889, 867.

Tatusia hybrida Hatcher, Narrative Patagonian Exped., I, 1903, 116. Habits and distribution.

General color of cephalic shield and carapace dark brown, irregularly varied with lighter, the lateral edges of both areas much lighter, pale yellow or whitish, particularly the lateral row of plates on the carapace; tail yellowish, mottled with darker; posterior edge of dorsal plates thickly set with very short fine blackish hairs, interspersed with long yellowish brown and whitish bristles, 40 to 50 mm. long, thinly veiling the carapace; below thickly clothed with long rather coarse hairs, yellowish white on the ventral surface, brownish on the shoulders and thighs; sides of head thickly covered with fine short dark brown hairs, forming a broad lateral band.

Measurements.—Adult male, total length, 395 mm.; tail, 140; hind foot, 63; ear (in dry skin), 14. Adult female, total length, 390; tail, 120; hind foot, 60. Skull, total length, 68–70; zygomatic breadth, 39–42; mastoid breadth, 35–37.

Represented by 6 specimens (two immature), collected by Mr. Colburn near Swan Lake, March 5 and 6, and by one specimen collected by Mr. Barnum Brown, near the junction of the Rio Chico and the Rio Santa Cruz.

This species, like other Armadillos, varies greatly in cranial characters with age, as shown by the three skulls figured on Plate III, where Fig. 1–1*b* represents the skull of an animal about half grown; Fig. 2–2*b*, a skull of a much older animal, and apparently full grown to judge by the appearance of the skull; Fig. 3–3*b* represents the skull of a very old individual, the skull being much larger, very heavily ossified, and disproportionately broader than either of the others. Compared with full-grown middle-aged specimens, it differs from the latter so strikingly that, without intermediate specimens, it might readily be mistaken for a different species.

According to Mr. Hatcher's observations, the Rio Santa Cruz forms the southern boundary of the range of the species, whence it extends northward to Paraguay and northern Argentina.

Mr. Hatcher in referring to the animal life of the country bordering the lower Rio Chalia, chronicles (Narrative, pp. 116, 117) his first meeting with this little Armadillo (erroneously here called *Tatusia hybrida*), and gives the following important information about its distribution and habits in southern Patagonia:

"In addition to all these and many other birds and mammals, which had been our daily companions ever since our arrival in Patagonia, there was one curious little mammal belonging to an entirely different order, representatives of which we had not met with south of the Santa Cruz River. I refer to the little Armadillo, *Tatusia hybrida*. Frequent examples of these were to be seen running about over the pampa or lying prone upon the ground. Immediately on touching one of these little animals, they roll themselves up into a compact ball in much the same manner as do some of the leeches or species of chitons, on being detached from the stones to the surface of which they are usually fixed. When in this position the bony covering of the carapace serves to protect them from their ordinary enemies. They live in shallow holes excavated in the surface of the pampa, and if by any chance they succeed in reaching the mouth of one of these before being captured, they force the serrated edges of the carapace into the surrounding dirt in such manner that they can be extracted only with the greatest difficulty. At this latitude they hibernate in winter and prefer a warm sandy soil and sheltered locality. In such places they are fairly abundant north of the Santa Cruz River, but we never observed a specimen south of that stream, nor after careful enquiries could I discover that they had ever been seen by others in the region lying south of this river. It seems probable, therefore, that this stream has afforded an effective barrier to their further distribution to the southward, for not only are there many localities to the south that would seem quite as well adapted to their needs as those to the north, but the entire southern half of the valley of that river is especially well suited to them. Though common in the valley on the north side of the river, no example has ever been taken to my knowledge in the valley on the south side. The temperature of the water in this stream, its great size, and the absolutely treeless nature of the entire region through which it flows renders it particularly capable of presenting an effective barrier to the free migration of certain mammals, and more especially those like *Tatusia*, which are probably not capable of swimming and are known to hibernate in winter, at which period alone they would be able to cross such a stream on the ice. Their flesh is of an excellent flavor and highly prized by the natives as food."

Mr. Prichard confirms Hatcher's statement regarding the absence of this animal south of the Rio Santa Cruz. He found it "very common in the vicinity of Bahia Camerones." He further says: "I saw no specimen in the forests of the Andes, but near Lake Buenos Aires and Lake Viedma we found them about the foothills" (*l. c.*, p. 258).

Order UNGULATA.

The Ungulates are represented in the existing fauna of southern Patagonia by two species only, the Guanaco, belonging to the Camelidæ, and the Guamul, a Cervid.

FAMILY *CERVIDÆ.*

The Deer of Patagonia constitutes a peculiar type restricted to the southern Andean region. Although it has only recently become well known, it has a peculiarly interesting literary history, as shown below.

Genus HIPPOCAMELUS Leuckart.

Hippocamelus Leuckart, De Equo bisulco Molinæ, 1816, 23. Type, *Hippocamelus dubius* = *Equus bisulcus* Molina.—Thomas, P. Z. S., 1898, 212.—T. S. Palmer, Science (2), X, No. 249, Oct. 6, 1899, 494; Index Gen. Mamm., 1904, 326.

Cervequus Lesson, Nouv. Tabl. Règne Anim., 1842, 173. Type and only species, *Equus bisulcus* Molina.

Furcifer Wagner, Schreber's Säug. Suppl., IV, 1844, 384. Type and only species, *Cervus antisiensis* Pucheran = *Equus bisulcus* Molina.—Gray, P. Z. S., 1850, 236.

Xenelaphus Gray, P. Z. S., 1869, 498. Type, *Xenelaphus huamel*, sp. nov. = *Equus bisulcus* Molina (♂ with malformed antlers).

Anomalocera Gray, Scientific Opinion, Oct. 6, 1869, 385. (*Cf.* Philippi, Arch. f. Naturg., 1870, i, 46.)

Huamela Gray, Ann. and Mag. Nat. Hist. (4), X, Dec. 1872, 445 (in text); *ibid.*, XI, March, 1873, 217. Type, *Huamela leucotis* (Gray) = *Equus bisulcus* Molina.

Creagoceros Fitzinger, Sitzb. Akad. Wien, LXVIII, 1873, 358. Includes *Cervus antisiensis* D'Orbigny, and *Cervus chilensis* Gay & Gervais.

In 1782, Molina, as is well known, mentioned and gave names to a large number of the mammals of Chili, describing some of them in sufficient detail for their easy recognition, and others more vaguely, so that their identification is more difficult. Among the latter is the "Guemul," or "Huemul," which he named technically *Equus bisulcus*. He certainly could not have been familiar with the animal, and probably described it from hearsay information, comparing it with the horse and ass, and in no way making any suggestion of its relation to the deer tribe. In fact he gives no character that is in any way distinctive of the animal. Yet, apparently mainly on the basis of its vernacular name, the animal is now universally conceded to be the species first properly introduced into scientific literature by Gay and Gervais in 1846 under the name *Cervus chilensis*, which they recognized as "le Guamul des Chiliens," and also as the *Equus bisulcus* of Molina. In the meantime Molina's animal had been introduced into the works of the earlier systematists as a species of *Equus*, and as late as 1827 was recorded as a species of *Auchenia* on the basis of Molina's account. In 1803 it became the subject of a Latin dissertation by Leuckart, who made it the basis of his genus *Hippocamelus*, substituting at the same time the specific name *dubius* (*Hippocamelus dubius*) for Molina's name *bisulcus*.

Mr. Lydekker, in his "Deer of All Lands," has adopted, as have Dr. Matschie and others, the name *bisulcus* Molina for the species, but he rejects *Hippocamelus*, as also the later *Cervequus* Lesson, "on account of their inappropriate nature," for the later *Xenelaphus* Gray. This statement amounts to the concession that the "inappropriateness" of the name *Hippocamelus* is the only objection to its adoption, which is without weight under the rule that names are not to be rejected "because of barbarous origin, for faulty construction, for inapplicability of meaning, or for erroneous construction" (A. O. U. Code, Canon XXXI). It must therefore be adopted for the Guamul group of deer, as stated by Mr. Thomas in 1898 and by Dr. T. S. Palmer in 1899.

HIPPOCAMELUS BISULCUS (Molina).

(Plates IV, V, and VI, Skull.)

Equus bisulcus Molina, Sagg. Stor. Nat. Chile, 1782, 320.—Gmelin, Syst. Nat., I, 1788, 209 (ex Molina).—Fischer, Syn. Mam., 1829, 433 (ex Molina).

Cervus bisulcus Matschie, Ergeb. Hamb. Magalh. Sammelreise, III, 1898, 19. Reinstates Molina's name *bisulcus*.

Mazama bisulca Lydekker, Deer of All Lands, 1898, 296; P. Z. S., 1899, 917, pl. lxi, animal, and head, text cut. Patagonia.—Berg, Comunic. Mus. nac. de Buenos Aires, I, No. 7, Oct. 1900, 260–263 (full synonymy).

Hippocamelus bisulcus Thomas, P. Z. S., 1898, 212, Chubut, East Patagonia.

Xenelaphus bisulcus Prichard, P. Z. S., 1902, I, 172; Through Heart of Patagonia, 1902, 146 (description and half-tone plate of skull), 152 (colored plate of animal in summer coat), 248–251 (habits and distribution and text cut of skull).

Camelus equinus Treviranus, Mus. Biol., II, 1803, 179 (ex Molina).

Hippocamelus dubius Leuckart, De Equo bisulco Molinæ, 1816, 24; Isis, 1825, 362 (ex Molina).

Auchenia huamel Ham. Smith, Griffith's An. King., V, 1827, 300 (ex Molina).

Furcifer huamel Gray, P. Z. S., 1850, 236; Ann. and Mag. Nat. Hist. (2), IX, May, 1852, 427; Cat. Mamm. Brit. Mus., Ungulata Furc., 1852, 227.

Cervus (*Cervequus*) *andicus* Lesson, Nouv. Tabl. Règne Anim., 1842, 173 (= *Equus bisulcus* Molina).

Furcifer andicus Lahille, Congr. Cient. Lat. Amer., III, 1899 (1900), 195.

Cervus chilensis Gay & Gervais, Ann. des Sci. nat. (3), V, 1846, 91. Chili: original description.—Gay, Hist. Chile, Zool., I, 1847–1854, 159, pl. ii.—Sclater, Ann. and Mag. Nat. Hist. (4), XI, 1873, 213 (with reference to *Huamela leucotis* Gray); P. Z. S., 1875, 44, text cut of brow antler; synonymy.—Burmeister, Desc. phys. Rép. Arg., III, 1879, 462 (in part).—Philippi, Anal. Mus. nac. Chile, Zool., 1894, pl. i, fig. 1.

Cervus (*Furcifer*) *chilensis* Wagner, Schreber's Säug. Suppl., V, 1855, 382.

Creagroceros chilensis Fitzinger, Sitzb. Akad. Wien, LXVIII, 1873, 358; *ibid.*, LXXVIII, 1879, 372.

Cariacus (*Furcifer*) *chilensis* Brooke, P. Z. S., 1878, 923.

Cariacus chilensis Hatcher, Narrative Princeton Univ. Exp. Patagonia, I, 1903, 185, 271.

Capreolus leucotis Gray, P. Z. S., 1849, 64, pl. xii, "shot twenty leagues from Port Famine, Straits of Magellan."

Xenelaphus leucotis Gray, Cat. Rum. Mamm., 1872, 89 (in part).
Huamela leucotis Gray, Ann. Mag. Nat. Hist. (4), X, Dec. 1872, 445; *ibid.*, XI, March, 1873, 214–219, text cut of skull; Hand List Edent., Thick-skinned, and Rum. Mamm. Brit. Mus., 1873, 160.
Furcifer chilensis Sclater, List Anim. Zoöl. Gardens, 1883, 178, and later editions. — Nehring, Sitzb. Gesell. Naturf. Freunde Berlin, 1885, 188; *ibid.*, 1895, 16. — Trouessart, Cat. Mamm., 1898, 897.

Form stout and heavy. Antlers small, with a single fork near the base, the front tine less than half as large as the main branch, both nearly vertical in direction.

Winter Pelage. — General color of body above and limbs grizzled yellowish brown; the hairs individually are ashy for about the basal two thirds, then pass gradually into blackish, with a narrow subapical band of pale yellowish brown, and a minute black tip, resulting in a grizzled yellowish gray-brown general effect; flanks and ventral surfaces similar, except that the median abdominal area is suffused with blackish; black facial pattern Y-shaped, the arms of the Y beginning over each eye and uniting on the median line somewhat in front of the eyes and passing forward as a rather sharply defined band to the end of the nose, where it spreads laterally to the sides of the lower jaw, thus forming a black cross-band a little behind the muzzle; a broad, light-colored eye-ring; lachrymal pit and eyelids blackish; cheeks and sides of neck lighter and grayer than the body; ears well clothed, grayish externally, varied with pale yellowish brown, white internally; tail above and on the sides like the back, lower surface white; inguinal region white, passing into pale yellowish brown on the inside of the thighs; inner side of fore legs near the body light yellowish brown; tarsal glandular tuft close to the tarsal joint, the anterior upper two thirds whitish, the lower part dusky passing posteriorly into rusty brown.

Measurements. — Two adult males, respectively, total length 1575 mm. and 1727; girth at chest, 965 and 1143. Adult female, total length, 1549; girth at chest, 1143. The following measurements are from an adult mounted male in the American Museum of Natural History (No. 13558), collected by Mr. Peterson at the eastern base of the Cordilleras, at the head of the Rio Chico de Santa Cruz, February 18, 1897: Total length, following the curves of the body, 1750; tail vertebræ, 120; hind foot, 425; height at shoulders, 930; ear from crown, 200; from notch, 170; main tine of antler from burr, 260; short tine from burr, 165; main tine from fork, 180; short tine from fork, 95.

Male skull, adult but not old: Total length, 295; basal length, 260; zygomatic breadth, 107; greatest orbital width, 115; greatest occipital breadth, 88; distance between base of antlers at the skull surface, 52; length of nasals, 100; greatest breadth of nasals, 30; palatal length, 174; anterior palatal foramina (each), 37 × 10; width of palate at m^3, 41; length of upper tooth row, 86; length of lower jaw, inner base of incisors to posterior border of condyle, 217; height at condyle, 96; lower premolar-molar series, 89; diastema, 67; Antlers: length of main tine from burr, 225; length of anterior tine from burr, 178; length of main tine from fork, 166; of anterior from fork, 113; length of bony pedical, 17.

Represented by 5 specimens, 4 males and 1 female, collected at the eastern base of the Cordilleras at the head of the Rio Chico de Santa Cruz, February 10–18 and March 1, 1897, by Messrs. Peterson and Hatcher.

The Patagonian Guamul differs from the Peruvian Guamul (*Hippocamelus antisiensis*) in smaller size, stouter antlers, with the anterior tine relatively smaller, and the point of bifurcation a little further up from the burr, and the facial black markings less extended posteriorly. In general coloration, and doubtless in habits, the two species have a close general resemblance.

The Patagonian animal has been repeatedly described and figured, a recent excellent colored figure of it having been published by Lydekker (Proc. Zoöl. Soc. London, 1899, pl. lxi), together with a good text cut of the head (*l. c.*, p. 918). Prichard (*l. c.*) has also recently given a good figure of the animal in summer coat.

The group of Guamul deer presents a case of unusually complicated synonymy, which, however, has been carefully sifted and straightened out, first by Sclater and later by Matschie, Lydekker, and Berg, by whose labors I have greatly profited in the present connection. On the rather unsatisfactory principle of exclusion, and the vernacular name used by Molina, the three last named authors have seen proper to employ Molina's specific designation *bisulcus* for the present species, the adoption of which seems unfortunately necessary under the rule of priority, there being of course no reasonable doubt as to what animal Molina so vaguely indicated under this name.

As shown by the following field notes, contributed by Mr. Brown, and the excerpts from Mr. Hatcher's "Narrative," the range of this species in Patagonia is confined to the immediate vicinity of the Cordilleras. Mr. Brown, in referring to this species, says:

"No deer are to be found on the plains, but one species is fairly abundant in the mountains. It is about the size of the Virginia deer; the males armed with a pair of two-pronged antlers. I killed two and saw many, but only the one species. Unlike the guanaco that have never seen man, these deer are very tame, allowing one to approach within a few yards of them." (Barnum Brown, MSS. notes.)

Mr. Hatcher, in writing of the region to the east and southeast of Lake Buenos Aires, thus refers to the deer:

"While nowhere in the plains region of Patagonia had we seen the Chilian deer, *Cariacus chilensis*, yet I was not greatly surprised to encounter it here in a region which, though destitute of forests and distant from fifty to one hundred and twenty-five miles from the Andes, had all the characteristics of a rugged mountainous region, when one descended from the narrow, flat-topped tablelands to the bottoms of the cañons. I not only met with deer on various occasions in these cañons, but on returning to camp after this my first protracted journey in this region, as I was traveling up the chasm in which we had pitched our tent, I came suddenly upon a band of three at a distance of hardly more than half a mile from camp. Since we had thought of remaining where we were for the winter, this seemed an excellent opportunity for providing an ample supply of jerked venison, which is far superior to the flesh of the guanaco." (Hatcher, *l. c.*, p. 185.)

His first meeting with this animal, however, was in the primeval forests at the base of the Andes, some distance to the southwest near Mayer Basin. He says:

"After a few hours spent in a vain search for mammalian remains in these beds I started for camp, returning by way of the forest through which I had passed on my way thither. Just as I was emerging from the wooded tract into the meadow land in front, I came suddenly and unexpectedly upon three deer browsing quietly in the grass along the margin of the wood. They were the first I had seen in Patagonia, and for a moment it was evident that I was the most startled individual of the four. They made no effort to escape, as they might easily have done by taking to the wood, but stood at a distance of not more than twenty feet, returning my expression of surprise with one of interested curiosity. For an instant I stood admiring the rich golden brown of their sleek, glossy coats, as they alternately cropped the rosebuds and other choice morsels from the foliage about them, or cast inquiring glances toward me. Suddenly, remembering that we had been without fresh meat for breakfast, I deliberately, though reluctantly, drew my revolver from its scabbard, and having for a moment subdued the compassionate feeling with which I had been seized, it required little skill to despatch one of the trio and demonstrate that man is not less brutal than other animals. Indeed, from a certain, and to my mind questionable standpoint, it was about as unsportsmanlike an act as could have been committed. But, like others even more unsportsmanlike which I shall later have occasion to relate, it served the double purpose of providing us with a supply of meat and an addition to our collection of the skins of recent Mammalia. The two companions remained, unalarmed either by the report of the fatal shot, or the death struggles of their companion. While engaged in skinning and dressing the carcass of the dead animal, the live ones stood at a distance of only a few yards, either indifferent, or at most only curious as to the nature of the operation, and I could at any moment have easily despatched them, had I been so inclined. Covering the carcass and skin with brush so as to protect them from the caranchas, I returned to camp, and, saddling a horse, conveyed both to our tent, where they were properly cared for." (Hatcher, *l. c.*, pp. 130, 131.)

The following forcibly illustrates the tameness of these animals in their native haunts:

"In the early morning and late afternoon deer were common about the edges of the wood and in the small open parks within, while in the middle of the day they were frequently met with in the depths of the forests. The degree of confidence and fearlessness displayed by these traditionally timid animals was indeed most remarkable. It was plainly evident that they were entirely unacquainted with man. On one occasion, while tramping through the woods with my shotgun in quest of smaller game, I came upon a full grown male lying quietly at the base of a large tree. As I stopped to observe him, he remained quite still for a moment and looked at me, with nothing of fright in his countenance. Then slowly getting upon his feet he came walking directly toward me with that measured and firm tread characteristic of the family. The entire attitude and bearing of the animal resembled that of a favorite cow or horse, as, lazily basking in the barnyard, it rises and advances slowly to lick the proffered hand of its master. I permitted this exhibition of confidence to continue until he had approached to some ten or twelve feet of me, when I showed my unworthiness by exchanging a charge of small for one of solid shot, which, after backing away for a few paces I discharged with such effect that the beautiful animal fell lifeless almost at my feet, a victim of misplaced confidence." (Hatcher, *l. c.*, pp. 137, 138.)

Mr. Hatcher makes further reference to their tameness, as observed in Mayer Basin, on page 200 of his " Narrative, " and again on page 266, when they would approach to within a few feet while he and Mr. Peterson were " skinning and dressing the carcass of their fallen comrade, often approaching so near that we would be compelled to suspend operations and urge the spectators to remove to a more respectful distance."

Mr. Prichard's account of this deer is very full and quite in harmony with the observations of Mr. Hatcher and Mr. Brown, already given, including its tameness, geographical distribution, and general habits. Mr. Prichard says they shed their winter coat in December. He gives a colored plate of the animal in summer coat, and good half-tone illustrations of the skull. When he first published his account of the species little had been made public concerning its habits and distribution. (See *l. c.*, especially pp. 248–251.)

Family *CAMELIDÆ*.

Genus LAMA Cuvier.

Camelus Linn. Syst. Nat. ed. 10, 1758, 65 (in part).

Lama Frisch, Natur-Syst. vierfüss. Thiere, 1775 (*apud* Palmer, Index Gen. Mamm., 1904, 363, 921). — G. Cuvier, Tabl. Élém. Hist. Nat. Anim., 1798, 158 (= "les Lamas") ; Leçons d'Anat. Comp., I, tab. 1, 1800. — Desmarest, Nouv. Dict. d'Hist. Nat., XXIV, 1804, Tabl. mèth. 31. — G. Fischer, Zoognosia, III, 1814, 351. — Gray, Cat. Mamm. Br. Mus., III, Ungulata Furcipeda, 1852, 254. — Thomas, P. Z. S., 1891, 385.

Lacma Tiedemann, Zool., I, 1808, 420 (= *Lama* G. Cuvier, 1798).

Auchenia Illiger, Prod. Syst. Nat., 1811, 103 (*Lama* G. Cuvier ; also preoccupied for a genus of Coleoptera). — G. Cuvier, Règne Anim., I, 1817, 251. — Wagner, Schreber's Säug., V, ii, 1838, 1788.

Dromedarius Wagler, Natürl. Syst. der Amphib., 1830, 31 (to replace *Auchenia* Illiger, preoccupied).

The name *Lama* (Frisch, 1775; G. Cuvier, 1798) has priority over the, for a long time, more current name *Auchenia* (Illiger, 1811), and should be adopted for the genus, as long since shown by Thomas (*l. c.*). Of the four forms of these animals commonly recognized, the Guanaco, Llama, Alpaca, and Vicuña, only the first comes within the scope of the present work.

Opinions differ as to whether these animals are to be treated as distinct species, or whether they are all to be considered as races of a single species. Mr. Thomas (*l. c.*) has given his reasons for considering the Vicuña as a distinct species, and the Llama and Alpaca as merely domesticated races of the Guanaco, thus recognizing two species.

LAMA GLAMA HUANACUS (Molina).

Camelus glama Linn. Syst. Nat. ed. 10, 1758, 65 (in part — based on the domesticated race). — Shaw, Gen. Zoöl., II, ii, 1801, 241, pl. clxviii.

Camelus guanacoe P. S. L. Müller, Natursyst. Suppl., 1776, 26, Patagonia.

Camelus lacma G. Cuvier, Tabl. élém. Hist. Nat., 1798, 158.

Camelus huanacus Molina, Sagg. Stor. Nat. Chili, 1782, 317.

Auchenia huanaca Ham. Smith, Griffith's An. King., V, 1827, 299 (in part). — Tschudi, Fauna Peruana, I, 1844–46 (1846), 222.

Lama huanacus Matschie, Ergebn. der Hamb. Magalhæns. Sammelreise, III, Säug., 1898, 19. — Berg, Comun. Mus. nac. de Buenos Aires, I, No. 7, Oct., 1900, 260 (synonymy).

Lama huanachus Thomas, P. Z. S., 1891, 387 (nomenclature). — Trouessart, Cat. Mamm., 1898, 846; Prichard, Through Heart of Patagonia, 1902, 104–107 (Indian method of hunting), 138–140 (hunting), 156 (head of young), 160 (pl., "descending a hillside"), 236–239 (habits), 253–257 (habits, etc., side view of head); P. Z. S., 1902, I, 275.

Auchenia lama, b. *guanaco* Wagner, Schreber's Säug., V, ii, 1836, 1803, 1806–1810, pl. cccv *a*.

Auchenia llama Waterhouse, Zoöl. Voy. Beagle, Mamm. ii, 1839, 26 (with notes on habits and distribution by Darwin).

Auchenia lama Brandt, Mém. Acad. Imp. St. Pétersb., IV, 1845, 1, pl. i, ii. — Cassin, U. S. Expl. Exp. (Wilkes), Mamm. and Orn., 1858, 65 (Rio Negro; Tierra del Fuego). — Burmeister, Desc. phys. Rép. Argent., III, 1879, 457.

Camelus guanaco Traile, Mem. Wern. Nat. Hist. Soc., IV, 1823, 492, pl.
Auchenia guanaco Meyen, Nov. Ac. Acad. Leopold.-Cæs., XVI, 1833, 552, pl. lx.
Lama guanaco Gay, Hist. Chili, Zool., I, 1847, 153.
Lama guanacus Gray, Cat. Mamm. Br. Mus., Ungul. Furcip., 1852, 257, pl. xxiv, fig. 2, skull.
Guanaco, Cunningham, Nat. Hist. Strait Magellan, 1871, 106–109 (habits). — Hatcher, Rep. Princeton Univ. Exped. Patagonia, I, pp. 58, 62, 271, and elsewhere *passim* (habits and distribution).

In winter pelage the general color above is reddish brown, darkening a little on the rump and tail, this being the color of the long over hair, beneath which is a dense, matted covering of short woolly under fur, of much lighter color; flanks and ventral surface white; head all around and ears gray, lighter or paler on the throat and sides of the face, and darker, dusky gray on the whole front and top of the head; edges and tips of the ears and the muzzle whitish; fore limbs externally like the dorsal surface as far as the "knees," then dark grayish brown to the hoofs, more or less mottled with rufous; hind limbs externally rufous as far as the callosity, the grayish passing into rufous on the metatarsus and toes; inside of both fore and hind limbs white, like the ventral surface.

Young a few weeks old are similar in general coloration and markings to the adults except that the upper parts are lighter rufous and the under parts clearer white.

A large series of specimens (about 20) of this species was taken by Messrs. Peterson and Hatcher, chiefly in the vicinity of the coast near Cape Fairweather, but only a small part of them have passed through my hands. Mr. Peterson's measurements show that adults range in total length from about 1950 to 2150 mm., with a girth of about 1270, and that adult females attain very nearly the same dimensions.

Much has been published on the habits of the Guanaco, as observed in different parts of its range, by different writers, especially by Darwin, Cunningham, Hudson, and Prichard, but a transcript of Mr. Hatcher's observations, with a few additional notes by Mr. Barnum Brown, do not appear to be out of place in the present connection. Mr. Brown's manuscript notes are as follows:

"The Guanaco, which is by far the most numerous of the large mammals, ranges from Grandi Island, about 100 miles north of Cape Horn, over all of Patagonia that I have traversed; that is north to 46° N., from the Andes to the coast.

"Although there are a good many Guanacos on Tierra del Fuego, and a few on the other small islands, Lenox and Grandi, the extremely moist climate, with its consequent peculiarities of vegetation, principally mosses and lichens, does not seem suited to it. . . .

"Contrary to Mr. Darwin, I should not call this an elegant animal. It seems ill-proportioned and awkward, especially when running, when the body seemingly has two separate motions, reminding one of a hobby-horse with a movable neck. The Guanaco has but two movements, the walk and the gallop. When galloping both hind legs are moved together, a fact which makes it necessary for the Indians to throw their bola so as to catch a hind and a fore leg, as a bola tied around the hind legs in no way retards the forward movement.

"Near settlements, along the coast and rivers where they frequently see men, the Guanaco is quite easily approached, being seemingly not afraid of man, but merely curious. I have often been within fifty yards of them. In fencing in the large estancias great numbers are often enclosed, where they may be seen feeding contentedly with the sheep. In the Andes and on the high pampas, however, where they never see man, one rarely gets closer than three or four hundred yards; more often only a hideous, mirage-distorted figure is seen as they disappear in the distance. Here they are as wild as our western Pronghorn.

"During the summer months they feed singly and in small groups scattered over the pampas; rarely more than a dozen are found together. But during the winter months, as the snow gradually covers the grass on the pampas, they range toward the sea coast and rivers, and feed in large herds in the barancas or broken coast where the sea breezes melt the snow. From one hill in the Rincon de Boca, north of Rio Coy, I have counted four herds containing from three hundred to a thousand each.

"While feeding one of the males usually stands guard on higher ground, giving the alarm if an enemy appears. This alarm, the only noise I have heard them make except when fighting or brought to bay, is a prolonged drawn-out neigh.

"While camped in an old lake bed near the Cordilleras, I was startled one morning by a series of peculiar screams very much like those of a horse in distress. Running to a hill near by I saw two large males fighting. With ears laid back and mouth wide open, one rushed the other, this way and that, now turning, then in a straight run till near enough to cut a gash along his opponent's ribs with his sharp, hooked canines. Furious, the other turns with a scream, and runs after his antagonist till he, too, has scored a mark; and they kept at it over an hour until both were exhausted and badly cut up.

"When bunched during the winter months they feed together and run in close packs after their leaders like sheep. Remarkably fleet and sure-footed, they are as agile as the Rocky Mountain Sheep. When the ground was frozen several feet deep, with an inch melted on top, I have seen them, running at full speed, plunge over cliffs two or three hundred feet high at an angle of 75 degrees, where I deemed it too hazardous to attempt descent with the aid of a pick, and never have I seen one come to grief."

As will be seen from Mr. Hatcher's account, this observer does not consider the aid of man necessary to account for the presence of the Guanaco in Tierra del Fuego. The following excerpts are from Mr. Hatcher's "Narrative."

"The Guanaco is, to his [the Tehuelche Indian's] existence, the one important and indispensable animal. From its flesh he derives his chief, and for long periods, only sustenance, while from its skin his industrious wife constructs the family toldo and makes with admirable skill and patience their ample clothing and bedding, fitting and sewing the parts with the nicety and proficiency of a skilled seamstress. A wooden or bone awl, used as a delicate punch, is her needle, and the sinews taken from the loin of the same animal her thread. From this same beast he likewise obtains the sinew for the light but exceedingly strong thongs of his bolas.

"But the Guanacos are in no danger of extermination. They roam in thousands over the Patagonian plains. So abundant are they that, in traveling across the country, it is scarcely possible to pass out of sight of them. Contrary to the rule with undomesticated animals, the Guanacos inhabiting settled regions are far less timid than those of unsettled districts. In the region along the coast occupied by the sheep farmers they exist in great numbers, are exceedingly tame, and are a source of considerable annoyance to the herdsmen, who, nevertheless, suffer them to go unmolested. Beyond the settlements the Guanacos are more difficult of approach and in the Cordilleras they are exceedingly wary, as is also the Rhea, or so-called Ostrich. This is the more striking and difficult of explanation, since the deer in the same mountainous region seem absolutely fearless and are prompted by curiosity rather than fear when approached. . . .

"The Guanaco is not only the largest animal inhabiting Patagonia, but to the Tehuelche, at least, it is surely of the most importance. It is the American representative of the camel and, though readily domesticated, no attempt seems ever to have been made in this region, by either whites or Indians, to bring this species under domestication. There is little doubt, however, that the Llamas and Vicuñas, of Peru, are but domesticated varieties of the Guanaco.

"When full grown, the Guanaco is in size about equal to that of a yearling colt. I have elsewhere described their form, color and peculiar call. They are abundant on the plains, both of the mainland and Tierra del Fuego, having been found even to the southern limits of that island. They are also fairly common in the valleys of the Andes. Their presence in Tierra del Fuego, to which island the rhea, puma and Patagonian deer, *Cariacus chilensis*, have not gained access, is but an illustration of their superior powers of self-distribution. When hard-pressed they readily take to water, and when pursued by a pack of hounds have been known to take to the Gallegos River, at the place where the village now stands, where it has a width of three miles. With their well-known fearlessness of water, there is little wonder that they have been able to reach Tierra del Fuego, since the Magellan Strait, at both the first and second narrows, has a width of only two miles. They have a pecular habit, as remarked by Darwin, of dropping their dung in the same place, so that great accumulations of this are to be seen in piles scattered all over the plains. Some writers, more especially Hudson, have also claimed that the Guanacos of any particular region all resorted to a particular spot to die. My observations in Patagonia did not verify such a conclusion. It is true that I frequently observed a considerable number of Guanaco skeletons in the same immediate locality, but their presence in such places was easily accounted for. During the winter storms these animals would be driven from the surrounding plains to seek shelter in the river valleys and there, beneath embankments or clumps of bushes, would be found the remains of such as, through old age or disease, were unable to survive the rigors of the storm they had sought to escape. The abundance of Guanaco skeletons in such places is no more remarkable, and is, in fact, due to the same circumstances that have caused the presence of several skeletons of domestic cattle or, in earlier days, of buffalo, in similar places all over our western plains." (Hatcher, *l. c.*, pp. 266 and 271.)

Mr. Prichard has also given recently a very full account of the Guanaco (*l. c.*, pp. 253–287, and *passim*) adding many details of interest respecting its habits, and an account of the Indian and other methods of hunting it.

Order GLIRES.

Exclusive of the great family Muridæ, only four genera of Rodents are represented in southern Patagonia, namely, *Kerodon* and *Dolichotis* (family Caviidæ), *Viscaccia* (family Chinchillidæ), and *Ctenomys* (family Octodontidæ). The first three are each represented by a single species, but *Ctenomys* numbers at least four within the area here under consideration. They are all characteristic types of the pampas of Patagonia, Argentina, and southern Bolivia. Even northern Patagonia is quite beyond the range of Hares, Squirrels, Porcupines, and even of the large Rats of the genus *Nectomys*, and of the Spiny Rats so characteristic of southern Brazil and Paraguay.

The abundance of Rodents is a striking feature of the Patagonian fauna. Mr. Barnum Brown, who spent several months in 1899 in Tierra del Fuego, and traversed large portions of the island in his geological explorations, says (MSS. notes):

"Rodents are very abundant, especially in the valleys and along the foot-hills where the entire earth over large areas is completely undermined. In the northern part of Tierra del Fuego it is difficult to ride through the campos on account of these burrows."

Mr. Hatcher refers to the great numbers of these animals on the upper Rio Chico. In connection with his notice of the Burrowing Owl and the Short-eared Owl (Narrative, p. 121) he says: "And indeed there seemed no limit to this source of their food supply, for not only was the surface of the ground literally covered in many places with the well-used trails of these small mammals, which crossed in every conceivable direction, but in many places the earth beneath the surface was honeycombed to the depth of a foot or more with their subterranean burrows, in such manner that our horses sank at each step half way to their knees and the wheels of our cart plowed great ruts in the surface of the ground."

Again, at the moraine near the junction of the Rio Belgrano with the Rio Chico, he says (Narrative, p. 123): "The side of the slope, as well as the little plain at its foot, was literally alive with rodents." And then follows a more detailed account (pp. 124, 125) of the species observed, in which special reference is made to the Kerodon and the Tuco-tuco (*Ctenomys*), quoted in full under these species, and to various unidentified species of mice, as follows:

"In the small brush which grew at the base and over the slopes of the bluff above our camp, there lived a variety of small rodents for the most part characterized by large, thin ears, delicate soft fur of a bluish brown color above and lighter on the belly, with tails of various length, which in some species might be described as short and in others much attenuated.

"The tall grass which covered the river valley swarmed with myriads of small rodents somewhat larger than those just mentioned, with usually smaller ears, smaller tails, and a coarser pelage of an almost uniformly dull brown color. While these little animals were present in the greatest abundance they seemed all to pertain to one of two or three different species and exhibited very little variety of either form, size or color."

A heavy rainstorm made evident the fact that these little animals, especially the burrowing species, are quite an effective geological agent in producing erosion, and also that they suffer at times great destruction from the elements. On these points he says (p. 125):

"On walking about the following morning I was much impressed, not only with the amount of erosion which had been effected by the storm, but with the great destruction to animal life of which it had been the cause. Proceeding along the foot of the bluff, I observed a number of dead bodies of the little *Ctenomys magellanica* lying about upon the surface, and could only guess at the number of carcasses of these and other rodents that were buried beneath the débris, that during the night had been washed down from the bluff above and now lay at my feet, covering no inconsiderable portion of the surface of the valley to a depth varying from an inch to one or two feet. While the dead bodies of rodents belonging to other species were not wanting, the storm appeared to have been especially destructive to the little tuco-tuco, owing no doubt to the peculiar habit of that animal in burrowing so near the surface of the ground in search of food. When erosion on the surface had made an opening in the burrow at any point, a torrent of water would rush into the subterranean channel, either instantly drowning such of its inhabitants as were caught below, or driving them to seek refuge by escaping from the burrow where they were certain to meet with a similar death from the downpour of rain on the outside. As I walked about this morning considering the destruction wrought by the storm of the previous night, I was struck with the great importance of the work accomplished by rodents and other burrowing animals, when considered as agents of erosion, and it appeared to me that this source of erosion had not been given sufficient attention in our text books of geology, when treating of the various erosive agents."

FAMILY *CAVIIDÆ*.

KERODON AUSTRALIS (Is. Geoffroy).

(Plate VII, Fig. 1, Skull.)

Cavia australis Is. Geoffroy-St. Hilaire, Guérin's Mag. de Zool., 1833, Cl. I, pl. xii, animal. Northern Patagonia.—D'Orbigny, Voy. dans l'Amer. Mérid. Mamm., 26, pl. xviii, figs. 1–4.—Thomas, P. Z. S., 1898, 211. Chubut, E. Patagonia.—Hatcher, Narrative Princeton Univ. Patagonian Exped., I, 1903, 123, habits.

Cavia (*Cerodon*) *australis* Waterhouse, Mamm., II, 1848, 180, pl. iii, fig. 2, animal, pl. xvi, fig. 13, skull from below.

Cavia [*Anœma*] *australis* Burmeister, Descrip. phys. Rép. Argent., III, 1879, 272.

Kerodon kingii Bennett, P. Z. S., 1835, 90, Port Desire, Patagonia.—Waterhouse, Zoöl. Voy. Beagle, Mamm., 1839, 88.—Trouessart, Cat. Mamm., ii, 1897, 639.

Adult (March–May).—Above dark yellowish gray, finely varied with black; sides lighter, less varied with black-tipped hairs; ventral surface white with a slight yellowish tone, varied more or less with gray, through the showing more or less at the surface of the dull gray underfur; sides of nose, a narrow eye ring, and the space between the eye and ear yellowish gray, or buffy white, with a postauricular patch of pale buff; ears thinly clothed, the very short hairs yellowish gray on both surfaces; upper surface of feet pale yellowish gray, the toes lighter, clear pale buff; toe pads and callosities blackish.

Young.—Scarcely at all different from the adults, and, like the adults, different specimens vary from yellowish white to mottled grayish white below.

Adults vary individually in the amount of yellowish suffusion above, some being quite strongly yellowish, while others are dark gray with very little tinge of yellow.

Measurements.—Eight adult and semiadult males measure as follows: Total length, 217.5 mm. (210–230); hind foot, 50 (49–52). Eight adult and semiadult females: Total length, 218.8 (210–230); hind foot, 48.5 (47–52). The skulls show that few of the specimens of which the measurements are here given are full grown. No. 84180, a male, is the only very old individual, with the skull heavily ossified, in the series. This specimen has a total length of 230, and the length of the hind foot is 52. The skull of this specimen measures: Total length, 54; zygomatic breadth, 32; interorbital breadth, 10.5; greatest width of brain case, 25; mastoid breadth, 22; length of nasals, 19; palatal length, 24; palatal foramina, 7.4; diastema, 13; upper molar series, 13.5; lower jaw, length from inner base of incisors to posterior border of condyle, 36; do., to end of angular process, 42; height at condyle, 14; lower molar series, 13.5.

The next oldest skull is that of a female, No. 84182, which has the same external measurements as the male, namely, total length, 230, hind foot, 52. The skull, however, is considerably smaller, measuring as follows: Total length, 47; zygomatic breadth, 29; least interorbital breadth, 10; greatest width of brain case, 21; mastoid breadth, 15; palatal length, 20; palatal foramina, 5.3; diastema, 10.8; upper molar series, 11.2; lower jaw, length from inner base of incisors to posterior border of condyle, 31; do., to end of angular process, 35; height at condyle, 12; lower molar series, 11.3.

Represented by 29 specimens, of which 20 were collected by Mr. Colburn near Swan Lake and the Basaltic Cañons, in March and April, and the remaining 9 by Mr. Peterson, on the upper Rio Chico de Santa Cruz, in the valley close to the river, near the Cordilleras, during the month of February. Thus the pelage of only one season is represented.

This animal evidently continues to increase in size for a long period. Of the 29 specimens in the present collection only one or two, or at most three, appear to have reached fully adult conditions, and these do not show indications of old age. In this respect they resemble the Geomyidæ among North American Rodents, and the *Didelphis* group among Marsupials.

Charles Darwin's notes on the habits and distribution of this animal, as published by Waterhouse in "Zoölogy of the Voyage of the Beagle," are still worth quoting, and constitute nearly all that has been heretofore published on the subject. He says: "The Kerodon is common at intervals along the coast of Patagonia, from the Rio Negro (Lat. 41°) to the Strait of Magellan. It is very tame, and commonly feeds by day; it is said to bring forth two young ones at a birth. At the Rio Negro it frequents in great numbers the bottoms of old hedges; at Port Desire it lives beneath the ruins of the old Spanish buildings. One old male killed there weighed 3530 grains. At the Strait of Magellan, I have seen amongst the Patagonian Indians, cloaks for small children made with the skins of this little animal; and the Jesuit Falkner says, that the people of one of the southern tribes, take their name from the number of these animals which inhabit their country. The Spaniards and half-civilized Indians, call the Kerodon, 'conejos,' or rabbit; and thus the mistake has arisen, that rabbits are found in the neighborhood of the Strait of Magellan." — Darwin, Voyage of the Beagle, Mamm., pp. 88, 89.

Mr. Durnford (*cf.* Thomas, *l. c.*, p. 212), writes of its presence at Chubut, as follow: "Extremely abundant, and found in every clump of brushwood throughout the neighborhood. This little animal is very good eating. It sits up like a rabbit on its hind-quarters while chewing the mouthful it has just taken."

Mr. Hatcher (Narrative, p. 123) refers to their abundance at the junction of the Rio Belgrano and Rio Chico as follows: "Hopping about among the bushes and rocks were to be seen in great numbers representatives of the little gray, tailless and hare-like *Cavia australis*. Most interesting and amusing little creatures they are, as, always alert and intent on detecting the first approach of danger, they hop about from one position to another, or sit erect on their haunches and nibble unceasingly at a fragment of plantain leaf, or other morsel of food held conveniently in the fore paws. The favorite haunts of these little animals are shallow burrows about the bases of the larger bushes, or beneath certain herbaceous plants like *Bolax glabaria*, that grow in broad, dense, cæspitose masses upon the surface of the ground."

This little animal thus appears to be abundant over a wide extent of territory, in the foothills of the eastern base of the Andes as well as along the coast, and probably at all favorable localities throughout the intervening districts.

Genus DOLICHOTIS Desmarest.

Dolichotis Desmarest, Journ. Phys., LXXXVIII, 1819, 205; Mamm., II, 1822, 359, 360, footnote. Type *Dasyprocta patachonica* Desmarest = *Cavia patachonica* Shaw = *Cavia magellanica* Kerr (1792).

Mara Lesson, Cent. Zool., 1832, 113. Type, *Cavia patachonica* Shaw.

DOLICHOTIS MAGELLANICA (Kerr).

Hare Narborough, Voyage to Magellan, 1694, 33; also 1711, 33.

Patagonian Cavy Pennant, Hist. Quad., II, 1781, 363, pl. xxxix; 2d ed., II, 1793, 91, pl. xci. Based on Narborough's account and specimens. Port Desire, Patagonia.

Cavia magellanica Kerr, An. King, 1792, No. 454.

Dolichotis magellanica Thomas, Ann. and Mag. Nat. Hist. (5), IV, 1879, 397. Revival of Kerr's name.

Mara magellanica Lesson, Cent. Zool., 1832, 113, pl. xlii. (*Mara patagonica* on the plate.)

Cavia patachonica Shaw, Gen. Zoöl., II, i, 1801, 226, pl. clxv. From Pennant and Narborough; plate from a specimen in Leverian Museum, brought by Narborough from Patagonia. — Waterhouse, Zoöl. Voy. Beagle, Mamm., II, 1839, 89.

Chloromys patagonicus Desmoulins, Dict. class. d'Hist. Nat., IV, 1823, 47. — Lesson, Man. de Mamm., 1827, 301.

Mara patagonica Lesson, Cent. Zool., 1830, pl. xlii.

Dasyprocta patachonica Desmarest, Journ. de Phys., LXXXVIII, 1819, 205; Mamm., pt. ii, 1822, 358.

Dolichotis patachonica Waterhouse, Nat. Hist. Mamm., II, 1848, 158, pl. iii, fig. 1, animal, pl. iv, fig. i, skull. — Cassin, U. S. Expl. Exp. (Wilkes), Mamm. and Orn., 1858, 22, Patagonia.

Dasyprocta patagonium Schinz, Cuvier's Thierreich, IV, 1825, 324.

Chloromys patagonica Lesson, Mamm., 1827, 301.

Dolichotis patagonica Wagner, Schreber's Säug. Suppl., IV, 1844, 66. — Burmeister, Reise durch die La Plata-Staaten, II, 422, habits, external characters and anatomy; Desc. phys. Rép. Argent., III, 1879, 260. — Trouessart, Cat. Mamm., ii, 1897, 641. — Prichard, P. Z. S., 1902, I, 277; Through Heart of Patagonia, 1902, 67, 257, 258 (habits and distribution).

General color above dark gray, passing into black on the lower back and rump, forming a large black patch which extends laterally to the loins; thighs crossed by a broad band of white; ventral surface with a broad median band of yellowish white, occupying the middle of the throat, and the median ventral area from the posterior border of the pectoral region to the tail; pectoral and prepectoral areas dull ochraceous, which color also forms a broad lateral line from the cheeks to the loins, gradually passing into the gray of the upper parts; ears gray, thinly haired, the tips fringed with long rusty brown hairs, and the anterior base fulvous, joining a broad postocular patch of ochraceous brown; a narrow yellowish brown eye-ring, the lids and the long eyelashes black, as are also the whiskers; front and sides of nose pale yellowish; fore limbs externally gray, varied with black, passing into black on the feet; inside of fore limbs ochraceous buff; hind limbs pale yellowish gray proximally, passing first into fawn, and then into yellowish gray on the proximal half of the tarsus, mixed with black on the apical portion, and the toes black; inner surface of hind limbs pale fulvous; toe pads and tarsal callosity black; rest of under surface of hind feet heavily clothed with rusty fulvous hairs.

There are no flesh measurements but a well made skin gives the following: Total length, 620 mm.; tail, 12; hind foot, 143; ear from notch, 63.

The Patagonian Cavy is represented by a single specimen (skin and the complete skeleton), collected by Mr. J. B. Hatcher at the mouth of the Rio Chico, February 10, 1899. He makes, however, no reference to the species in his "Narrative." This locality appears to form its known southern limit of distribution. It is an animal of the arid plains, and its habits have been well described by Darwin and later writers. It lives in burrows, but feeds and roams about by day, wandering, according to Darwin, miles from its burrow, in little parties of two and three, and is shy and watchful. It brings forth two young at a birth, which are produced within the burrow. Its range appears to extend from about latitude 30° to latitude 50° south, wherever the country is favorable to its needs.

The Patagonian Cavy was first formally made known by Pennant in 1781, from a specimen in the Leverian Museum collected by Sir John Narborough near Port Desire, in Patagonia. Sir John refers to it as a "Hare" and says: ". . . they are shaped like English hares, and much larger, and instead of a tail have a little stub about an inch long, without hair on it; they have holes in the ground like Coneys."

Mr. Prichard says it is "called 'cavy' or 'hare' indiscriminately by the English residents; *liebre* by the Argentines and Chilians; *paahi* by the Tehuelches."

Although Mr. Hatcher obtained a specimen at the mouth of the Rio Chico, Mr. Prichard gives the Rio Deseado as the "southern limit of the distribution of the Patagonian Cavy," and adds:

"As far as my experience goes, I never observed a cavy after October 23, upon which day I counted fourteen upon the pampa between Lake Musters and the settlement of Colohuapi. The residents of Colohuapi informed me that the place formed the southern limit of the distribution of the cavy. It is, of course, impossible to lay down an exact line, but I think it safe to say that the range of the cavy does not extend south of the 46th parallel. This limit is the more remarkable inasmuch as the country south of latitude 46° does not in any way materially differ from that over which the cavy is commonly to be met with. One most often finds these animals on patches of dry mud. They are comparatively easy to stalk, as easy as an English rabbit. The best method of shooting them is, of course, with the rifle, though occasionally you may start them from a thicket and shoot them as you would an English hare with a shot-gun. They generally weigh between 18 pounds and 25 pounds, though I heard of one which I was assured weighed 31 pounds." (*L. c.*, p. 257.)

Dolichotis magellanica ranges northward into southern Argentina, and is replaced in the Province of Cordova, central Argentina, by a northern subspecies *Dolichotis magellanica centricola* Thomas, where it occurs with the much smaller *D. salinicola* Burmeister.

Family *CHINCHILLIDÆ.*

The Viscacha of Paraguay and Argentina is the only member of the family Chinchillidæ known to occur in Patagonia, where it is apparently not found to the southward of the Rio Negro, and thus hardly calls for extended notice in the present connection. The genera *Chinchilla* and *Lagidium* are restricted to the Andean region, mainly of Peru and Chili.

Genus VISCACCIA Oken.

Viscacia Rafinesque, Anal. de la Nature, 1815, 56. Nomen nudum.
Viscaccia Oken, Lehrb. d. Naturg., III, 1816, 835. Type, *Lepus chilensis*

Oken = *Dipus maximus* Desmarest (ex Blainville). *Cf.* Allen, Proc. Biol. Soc. Wash., XV, 1902, 196.

Viscaccia Schinz, Cuvier's Thierreich, IV, 1825, 429. Type, *Viscaccia americana* Schinz, sp. nov. = *Dipus maximus* Desmarest (ex Blainville), 1817. *Cf.* Thomas, Proc. Biol. Soc. Wash., XIV, 25, April 2, 1901; Allen, *ibid.*, 181, Dec. 12, 1901.

Vizcacia Schinz, Naturg. und Abbild. der Säug., 1824–1828, 244 (*circa* 1826). Also 2d ed., 1827 = *Viscaccia* Schinz, 1825.—Lahille, Congr. Cien. Lat. Amer., III, 1899, 192. *Cf.* Palmer, Science (2), VI, No. 131, 21, 22, July 2, 1897.

Viscacia Rengger, Naturg. der Säug. Paraguay, 1830, 272, footnote. = *Viscaccia* Schinz, 1825 (= *Viscaccia* Oken, 1816).

Lagostomus Brookes, Trans. Linn. Soc. London, XVI, pt. 1, 1829, 102. Type, *Lagostomus trichodactylus*, sp. nov. = *Dipus maximus* Desmarest, 1817.

As shown by the above synonymy and references, the proper generic name of the Argentine Viscacha has been the subject of considerable discussion; and while Schinz in 1825 adopted for it the name *Viscaccia*, the same name appears to have been used for it nine years earlier by Oken, both uses of the name having the same basis, namely "la Vizcache" of Azara. Later Schinz varied the form of the name to *Vizcacia*.

As stated by me in 1901, the case is as follows: As has been fully shown,[1] there is no doubt of the pertinence of the generic name *Viscaccia* Schinz, 1825, to "la Vizcache" of Azara, the Argentine Viscacha. But it turns out that Oken (Lehrb. d. Naturg., Theil III, Abth. 2, p. 835, 1816) used the same term in 1816, in nearly the same sense. Oken included in his group or subgenus *Viscaccia* only two species: (1) *Lepus chilensis* and (2) *Mus laniger*. The first, notwithstanding the name *chilensis*, is based, as far as the description is concerned, wholly on "la Vizcache" of Azara, while in his diagnosis of the group *Viscaccia* he says "Zehen vorn 4, hinten 3," which would exclude his second species, the *Mus laniger* of Molina, and hence the Chinchilla of Peru. As Bennett, in 1829, made the Chinchilla the type of his genus *Chinchilla*, the Argentine Viscacha becomes by restriction the type and only species of Oken's *Viscaccia*, the authority for which name is thus Oken (1816) instead of Schinz (1825).

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[1] *Cf.* Palmer, Science, N. S., VI, p. 21, July 2, 1897; Thomas, Proc. Biol. Soc. Wash., XIV, p. 25, April 2, 1901; Allen, *ibid.*, p. 181, Dec. 2, 1901.

VISCACCIA CHILENSIS (Oken).

Vizcache Azara, Hist. Nat. Quad. Paraguay, II, 1801, 41. Not "La Viscaccia, *Lepus viscacia*," Molina, 1782; nor *Vizcacia viscacica* Rehn, Proc. Biol. Soc. Wash., XIII, 1900, 167; nor *Vizcacia viscacia* Allen, *ibid.*, XIV, 1901, 91.

[*Viscaccia*] *Lepus chilensis* Oken, Lehrb. d. Naturg., III, ii, 1816, 835. Based on the Vizcache of Azara, as above.

Viscaccia chilensis Allen, Proc. Biol. Soc. Wash., XV, Oct. 10, 1902, 196 (ex Oken).

Dipus maximus Desmarest (ex Blainville), Nouv. Dict. d'Hist. Nat., XIII, 1817, 117; Mamm., II, 1822, 212. Based on a living specimen seen in London, which specimen later became the basis of *Lagostomus trichodactylus* Brookes.

Vizcacia maxima Palmer, Science (2), VI, 1897, 21; Lahille, Congr. Cien. Lat. Amer., III, 1899, 192.

Viscacia maxima Berg, Com. Mus. nac. Buenos Aires, I, 1900, 220.

Viscaccia americana Schinz, Cuvier's Thierreich, IV, 1825, 429.

Vizcacia pamparum Schinz, Naturg. und Abbild. Säug., 1824–1828, 244 (*circa* 1826).

Lagostomus trichodactylus Brookes, Trans. Linn. Soc. London, XVI, 1829, 95, pl. ix (= *Dipus maximus* Desm. 1817, having been based on the same specimen).—Wagner, Schreber's Säug. Suppl., III, 1843, 310.—Waterhouse, Mamm., II, 1848, 212.—Hudson, P. Z. S., 1872, 822, 833, habits.—Burmeister, Descrip. phys. Rép. Argent., III, 1879, 247.

Callomys viscacia D'Orbigny & Is. Geoffroy Saint-Hilaire, Ann. des Sci. nat., XXI, 1830, 291, habits and distribution (= *Dipus maximus* Desm.; not *Lepus viscacia* Molina).

Lagostomus viscacha Meyen, Nova Acta Acad. Leopold.-Cæs., XVI, 1833 (1834), 584.

For many years the Argentine Viscache was currently known under the specific name *trichodactylus* (*Lagostomus trichodactylus* Brookes, 1829), but it was later found that *Dipus maximus* Desmarest (ex Blainville), 1817, referred to the same animal, and received acceptance as its proper specific name. But it unfortunately happens that Oken's name *chilensis* (*Lepus chilensis* Oken, 1816) has one year's priority over *maximus* of

Desmarest, both names having practically the same basis, namely, the Vizcacha of Azara. As I have elsewhere shown,[1] the Argentine Viscacha must apparently be called *Viscaccia chilensis* Oken.

This species is unrepresented in the present collection, its range not extending below the Rio Negro (latitude 41° south), and it thus barely reaches the northern border of the region here considered.

It has been so fully described and figured by Brookes, Waterhouse and others, that a detailed account of it seems uncalled for in the present connection. An extended notice of its habits has been given by Darwin, and later by Hudson, as observed by them on the pampas of Buenos Aires.

Family *OCTODONTIDÆ.*

Of the Octodonts only the Octodontinæ reach Patagonia, and of the five commonly recognized existing genera of this subfamily only one, *Ctenomys*, appears to have been found east of the southern Andes. The other four — *Aconæmys, Spalacopus, Abrocoma* and *Octodon* — occur within or on the western slope of the Andes, and are not, as now known, numerously represented in species. *Ctenomys,* on the other hand, is characteristic of the plains and pampas, ranging from Tierra del Fuego northward to southern Brazil and Bolivia, and westward into the base of the Andes. It is a plastic and prolific group, swarming in favorable localities, and readily susceptible to changes of environment. At least some twenty-five named forms are at present tentatively recognized, mostly on rather slight differences of size or color. Although the extreme phases are widely separated, it is probable that so many links still remain in the chain of intergradation that when the group comes to be more effectually known many of the forms now treated as species will be found to merge, and that some of the names stand for very little that is tangible. Several extinct forms have also been distinguished, the group extending back into the Pleistocene, and according to some authorities to the Pliocene.

The family Octodontidæ, as at present constituted, forms a very heterogeneous assemblage, comprising groups that might well be assigned to three distinct families. There is, for example, no close relationship between the *Octodon-Ctenomys* series and the Spiny Rats (*Loncheres-Echimys* series), or of either of these with *Ctenodactylus.* At different times each of these groups has been assigned, by different authors, the rank of a family, which disposition of them seems fairly to represent their real degree of affinity. We would thus have the comprehensive group Octodontidæ separated into (1) the true Octodonts, or Octodontidæ proper; (2) the Spiny Rats and their immediate allies, or Echimyidæ; (3) *Ctenodactylus* and allied genera, or Ctenodactylidæ. They are severally quite as distinct as are the commonly recognized families Heteromyidæ and Geomyidæ.

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[1] Proc. Biol. Soc. Wash., XV., 196, Oct. 10, 1902.

Genus CTENOMYS Blainville.

Ctenomys Blainville, Bull. Soc. Philomat., Paris, April, 1826, 64, pl.; Ann. Sci. Nat., IX, 1826, 102. Type, *Ctenomys brasiliensis* sp. nov., Minas Geraes, Brazil.

The Tuco-tucos, as the species of *Ctenomys* are known locally, represent, through closely similar adaptive modifications, in South America the Pocket Gophers (Geomyidæ) of North America. Both are modified for an almost exclusive life underground, having the same form of body, fossorial feet, degenerate organs of sight and hearing, and the same soft, silky pelage. The Tuco-tucos lack the external cheek-pouches of the Pocket Gophers, and differ from them in certain important cranial characters, although the general form of the skull and the structure of the teeth are similar in both. The form of the zygoma and the position and form of the infraorbital foramen are, however, notably different — features that perhaps warrant their wide dissociation as members respectively of the Hystricomorphs and Myomorphs.

The Tuco-tucos, as already said, are exceedingly prolific, in local forms as well as in individuals, and in favorable localities, as in alluvial or moist soils, their burrows fairly honeycomb the earth over considerable areas, rendering traveling, on foot or with horses, more or less difficult and even dangerous.

CTENOMYS MAGELLANICUS Bennett.

Ctenomys magellanicus Bennett, P. Z. S., 1835, 190. Port Gregory, Strait of Magellan; Trans. Zoöl. Soc. Lond., II, 1841, 84, pl. xvii, animal and skull; same specimen. — Waterhouse, Mamm., II, 1848, 283, pl. viii, skull, pl. ix, fig. 2, animal. Based wholly on Bennett's type specimen. — Burmeister, Descrip. phys. Rép. Argent., III, 1879, 239, ex Bennett and Waterhouse. — Trouessart, Cat. Mamm., ii, 1897, 599, part; only the references to Bennett and Waterhouse. —Thomas, P. Z. S., 1898, 211. Tombo Point, on the coast 60 miles south of mouth of Rio Chubut. —Lahille, Congr. Cien. Lat. Amer., III, 1899, 190.

Ctenomys neglectus Nehring, Zoolog. Anz., XXIII, Oct. 8, 1900, 535, fig. 1, skull. Based on a weathered skull from Patagonia.

Waterhouse's description and measurements of the type (*l. c.*) and then only known specimen of this species, being more concise and explicit than Bennett's, are here presented:

"General tint of the fur ashy grey, faintly suffused with yellow, and on the back brownish; abdomen pale ochreous yellow; tail very pale brown: the fur is moderately long, very soft, and of a deep slate grey colour at the root.

"Inhabits Port Gregory [=Cape Gregory of Bennett and of modern maps], Strait of Magalhaen.

	Inches.	Lines.	[mm.]
"Length from tip of nose to root of tail....	8	0	[203]
Length of tail........................	2	6	[63.5]
Length of fore foot and nails		10⅛	[22.1]
Length of longest nail		2⅔	[6.7]
Length of hind foot and nails	1	3½	[33]"

A nearly complete skull, and several others more or less incomplete (all weathered skulls—Nos. 23410–23413, U. S. Nat. Mus.), collected by Mr. Charles H. Townsend near Punta Arenas, Patagonia, during the cruise of the *Albatross* in 1887–1888, undoubtedly represent this species, to which I also refer a single specimen (No. 17444, Am. Mus.), skin and skull, and an additional younger skull (No. 17445, Am. Mus.) collected by Mr. Barnum Brown "30 miles south of the Port of Santa Cruz, on the coast" of Patagonia, and by him presented to the American Museum of Natural History. They agree well with Bennett's and Waterhouse's descriptions, and the younger skull agrees with their figure of the skull of the type, even in size. The other, a much older skull, is considerably larger. Mr. Brown's specimens came from about 150 miles north of the type locality and appear to be strictly referable to this species, which differs from the form inhabiting the Cordilleras at the head of the Rio Chico de Santa Cruz, presently to be described, in its very much paler colors, both above and below, but appears not to be distinguishable in cranial characters. It is a pale form, like the later described *Ctenomys fueginus* Philippi from Tierra del Fuego.

The original basis of *Ctenomys magellanicus* was a single specimen collected by Captain King at Cape (or Port) Gregory, on the northern side of the Strait of Magellan, and hence on the mainland of Patagonia. This specimen was considered by King to be "rather a young one," "from the size of the jaw, as compared with the abundant remains of this little animal which are scattered over the surface of the ground" (Trans. Zoöl. Soc. Lond., II, 1841, p. 85); and the skull, as figured by Bennett and Waterhouse, seems to bear out this conclusion, all of the sutures being shown to be very distinct, as in a young animal.

As late as 1848, Waterhouse stated (Mamm., II, p. 283) that, so far as he knew, but one specimen of this species of *Ctenomys* had been brought to Europe; and to this day little has been added to our knowledge of its range or habits beyond the three or four lines respecting the latter contributed by Captain King, namely: "The little animal is very timid; feeds upon grass, and is eaten by the Patagonian Indians. It dwells in holes, which it burrows, in the ground: and, from the number of holes, it would appear to be very abundant. It inhabits the east entrance of the Strait of Magelhaens at Cape Gregory and the vicinity."

In comparing this species with the other species of the genus then known, Waterhouse assumed that its small size was not due to immaturity, "all the teeth being fully developed." As shown, however, by the large series of an allied species in the present collection, the skull more than doubles in size (in bulk, not in linear dimensions) after "the teeth are fully developed"; and furthermore, that his specimen was really quite young, and probably also a female, as indicated by the straightness of the zygomatic arches.

In this connection, as bearing upon the comment on *Ctenomys neglectus* which here follows, it is worth while to note the unlikeness of Bennett's and Waterhouse's figures of the same skull, especially in respect to the position and direction of the fronto-parietal sutures, which are correctly drawn in Bennett's figure, and very erroneously represented in that published by Waterhouse.

In 1900 Dr. Nehring published (*l. c.*) as new a *Ctenomys neglectus* based on a Patagonian weathered skull, of which he gives a figure. He compares this skull with Bennett's figure of the skull of *C. magellanicus*, and is able to distinguish numerous differences between them, which appear to him weighty enough to warrant his treating this skull as the basis of a new species. His most important character is the presence of a deep, longitudinal sulcus on the upper side of the jugal. It is true that this is not shown in Bennett's figure, which is only slightly shaded, being mainly in outline; but I find this same sulcus is present, in a more or less marked manner, according to the age and sex of the animal, in all of my large series of the genus *Ctenomys* from Patagonia, which includes over fifty skulls, representing several more or less closely related forms. I have, therefore, no hesitation in regarding Nehring's *C. neglectus* as based on an adult female skull of one of the larger Patagonian species, in all probability *C. magellanicus*, although no definite locality is given for the specimen.

CTENOMYS FUEGINUS Philippi.

Ctenomys fueginus Philippi, Arch. f. Naturg., 1880, i, 276, pl. xiii, skull. Tierra del Fuego.—Lahille, Congr. Cien. Lat. Amer., III, 1899, 190.

Above mixed yellow and gray varied with black, the basal two thirds of the pelage blackish, with a subterminal band of white or light yellow, and the tips black; ventral surface white, the basal half of the pelage black and the apical half white; tail well clothed with soft hairs, above blackish, especially towards the tip, below clear yellowish white.

Measurements.—Head and body, 227 mm.; tail, 46 (= total length, 273); fore foot to end of claws, 26; longest fore claw, 10; hind foot, 35; longest hind claw, 6. Skull: total length, 49; zygomatic breadth, 28.5; mastoid breadth, 26. (Based on Philippi, *l. c.*)

This species was founded on specimens collected by Lieutenant Serrano of the Chilian Navy in the summer of 1878–79, on "der östlichen Insel des Feuerlandes," and was described and the skull figured by Professor Philippi in 1880 (*l. c.*).

In general appearance he found it not very different from the other species of the genus; his comparison of it, however, with *C. magellanicus* was made, in the absence of specimens, with Waterhouse's description and figure. He found the dimensions of the skull somewhat larger in *C. fueginus* than in *C. magellanicus*, and the zygoma outwardly more convex, as shown by his comparative figures of the skulls of the two species (*l. c.*, pl. xiii). But these differences are not necessarily important, since they are found in allied species to characterize the two sexes of the same species. Other coördinated differences are noted, so that he felt fully warranted in treating the Tierra del Fuego animal as distinct.

His description of the color of *C. fueginus* indicates a pale, ashy gray animal very different from that inhabiting the Cordilleras, but quite similar to *C. magellanicus*, the type locality of which is Cape Gregory, on the northern side of the Strait of Magellan. In view of its insular habitat, and in the absence of proper material for comparison, it seems best to give the species provisional recognition.

CTENOMYS ROBUSTUS Allen.

(Plate VII, Figs. 2 and 3, Skull.)

Ctenomys robustus Allen, Bull. Am. Mus. Nat. Hist., XIX, 185, May 9, 1903. Rio Chico de Santa Cruz, near the Cordilleras, Patagonia.

Pelage soft, short, somewhat lustrous. Above deep yellowish brown, varied with blackish, the hairs being dark slaty plumbeous for the basal two thirds, with a subterminal band of dark rusty yellow, and a very short black tip, with longer blackish-tipped hairs sparsely intermixed; below deep brownish ochraceous; ears dusky brown, barely projecting above the fur; upper surface of fore and hind feet dingy yellowish gray; tail well clothed with fine soft hairs, forming a slight pencil at the tip, yellowish gray, dusky at the tip above.

Other specimens vary from the above in being a little lighter or a little darker, both above and below. Tail variable in color, often wholly without any dusky median line above or any dusky tip; generally there is a very narrow median dusky line, extending from the tip anteriorly for a part or the whole of the length of the tail; in a few specimens it is strongly developed, broadens and increases in blackness towards the tip, and in rare cases the whole tip is black, with a short black stripe on the lower surface of the apical fourth or third of the tail.

Young examples differ from the adults in the general tint being duller and the pelage less lustrous.

Measurements. — Type: Total length, 290 mm.; tail vertebræ, 73; hind foot, 40. Nine adult males measure as follows: Total length, 303.5 (290–322; only one above 310, and only two above 298); tail vertebræ, 81.5 (73–88); hind foot, 40.5 (40–42). Five adult females; Total length, 275 (256–300; only one above 280); tail vertebræ, 75 (70–80); hind foot, 37 (35–40).

Skull, type: Total length, 52.5; basal length, 47; zygomatic breadth, 30; interorbital breadth, 10; mastoid breadth, 29.5; length of nasals, 20;

palatal length, 25; diastema, 16; upper molar series, 9.6; lower jaw, inner base of incisors to posterior border of condyle, 33; inner base of incisors to tip of angular process, 41; height at condyle, 16; lower molar series, 10.3; distance between condyles, 18; distance between tips of angular processes, 37. Ten adult male skulls: Total length, 53.6 (51–55); zygomatic breadth, 30.5 (29–33). Five adult female skulls: Total length, 48 (46–50); zygomatic breadth, 27.5 (26.2–28.6). The mastoid breadth is practically the same as the zygomatic breadth, varying in different specimens from slightly more to slightly less. The greater part of the skulls in the present series are middle-aged, with all the sutures distinct; only two or three give evidence of being very old.

Represented by 23 specimens, all from the upper Rio Chico, Cordilleras, and all collected by Mr. Peterson, February 7 to 28, and one March 6. All but three are in adult pelage, and these have nearly acquired it, only the lower part of the back and rump retaining the pelage characteristic of immaturity. The general color above of the adults varies from strong yellowish brown to slightly rufescent brown, and below from deep ochraceous buff to brownish ochraceous. The color of the tail is very variable, as already noted; except in the case of a few which have the tail practically uniform yellowish gray, no two have the tail colored alike, in respect to the median dorsal line, which varies from a slight trace of dusky to a well defined blackish median stripe, the black widening and increasing in intensity apically; in three specimens the whole tip of the tail is black, including the under surface, two of which are males and the other a female. A few other specimens approach this condition.

As shown by the measurements already given, the females are very much smaller than the males.

The skull is very variable in respect to size and many details of structure, but especially in the size and form of the interparietal. In one specimen it is almost obsolete, forming a mere line less than a millimeter in antero-posterior extent and 5 mm. in transverse extent. Generally it is subtriangular, with a transverse width of 5–7 mm., and an antero-posterior length of 2–4 mm. It is sometimes divided medially into two halves. On each side of the interparietal, and separated from it by the posterior extension of the parietals, is an intercalated bone of variable size and of an irregularly oval front outline, each generally considerably larger in area than the interparietal.

Ctenomys robustus differs markedly in coloration from *C. magellanicus*, but not very appreciably, so far as specimens of the latter are available for comparison, in size or cranial characters. *C. magellanicus* is pale yellowish gray, or ash gray with a fulvous tinge, while *C. robustus* is dark yellowish brown. *C. boliviensis* is very much larger and very much darker and redder, having "the general hue bright rufous brown," and the upper surface of the nose, head, and nape blackish. It appears to have no close relationship to any of the described species of *Ctenomys*.

It was met with only in the alluvial river valley of the upper Rio Chico, at the eastern base of the Andes. Mr. Peterson says of this species: "Very abundant, especially along streams. The ground they occupy is all undermined with their passages, which cross one another in all directions. They are seldom seen on the surface and are difficult to trap." (MSS. notes.) Most of the specimens of this species appear to have been taken in Mayer Basin, at the edge of the Cordilleras, since in writing of this region Mr. Hatcher refers incidentally to Mr. Peterson's obtaining here a splendid collection of rodents, "including a fine series of a much larger species of *Ctenomys* than any we had seen in the plains region" (Narrative, p. 138).

CTENOMYS SERICEUS Allen.

(Plate VIII, Figs. 1 and 2, Skull.)

Ctenomys sericeus Allen, Bull. Am. Mus. Nat. Hist., XIX, 187. May 9, 1903. Upper Rio Chico de Santa Cruz, near the Cordilleras, Patagonia.

Ctenomys magellanica Hatcher, Princeton University Exped. Patagonia, I, Narrative, 1903, 124. Not of Bennett.

Pelage short, soft, silky and lustrous. General color above yellowish gray strongly varied with black, the hairs being slaty plumbeous for the basal three fourths, then banded narrowly with pale yellowish brown and tipped with black; flanks and ventral surface buff; sides of nose yellowish brown; top of nose and top of head like median dorsal region, which is darker than the sides; ears very small, blackish; upper surface of feet dingy gray with a slight yellowish cast; tail pale yellowish, with a median dusky stripe along the apical half of the upper surface.

In some specimens there is a tendency to a well-marked darker median dorsal band, extending from the nose to the base of the tail. Several of the specimens are a little darker than the type above described. The tail stripe varies in distinctness from nearly obsolete to a broad, well-defined black band running the whole length of the tail.

Young in first pelage are grayer with less fulvous, and the pelage is longer, softer, and less firm.

Measurements.—Type: Total length, 208 mm.; tail vertebræ, 62; hind foot, 28. Five adult males: Total length, 200 (195–208); tail vertebræ, 56.6 (51–62); hind foot, 26.2 (25–28). A single adult female measures: Total length, 210; tail vertebræ, 60; hind foot, 27.

Skull, type: Total length, 39; basal length, 35.2; zygomatic breadth, 24; mastoid breadth, 23.5; interorbital breadth, 7; length of nasals, 13; palatal length, 17; diastema, 10; upper molar series, 7.5; lower jaw, inner base of incisors to posterior border of condyle, 26; inner base of incisors to end of angular process, 29.5; height at condyle, 7; width between condyles, 15.3; width between tips of angular processes 25.6; lower molar series, 8. Four adult male skulls: Total length, 36.4 (34.3–39); zygomatic breadth, 21.5 (20–23.6). An old female skull measures, total length, 36; zygomatic breadth, 20.

In several of the skulls the interparietal is entirely absent, and when present is very small. The lateral intercalated bones are present, and are as variable in form as already described in *Ctenomys robustus.*

Represented by 11 specimens, collected by Mr. Peterson in the Cordilleras of the upper Rio Chico de Santa Cruz, in the valley close to the river, Jan. 31 to Feb. 7, 1897. Six are adults and five are young, partly in the juvenile pelage.

This species considerably exceeds in size *Ctenomys pundti* Nehring, and differs from it very markedly in coloration. The total length of the skull of *C. pundti* is given as 31.3 mm., and the zygomatic breadth as 19.5; the same for *C. sericeus* (average specimens) being, respectively, 39 and 21.5 mm. While it agrees practically in size with *C. bergi* Thomas, from the central part of the Province of Cordova, it differs from it in color, being very much darker throughout.

Ctenomys sericeus occurs with the very much larger and very differently colored *C. robustus*, as both were collected on the same days and at the same localities by Mr. Peterson.

He says of this species: "Burrows extensively in the ground, leaving piles of dirt at the surface like pocket gophers (Geomyidæ). They make a drumming noise while sitting in the mouth of the burrows." (MSS. notes.)

Mr. Hatcher gives a somewhat extended account of the Tuco-tuco, which apparently refers mainly to the present species. The locality is the vicinity of the junction of the Rio Belgrano with the Rio Chico. He says (Narrative, pp. 124, 125):

"All about us, and indeed at times from immediately beneath our feet, could be heard the deep, subterranean drummings of the little tuco-tuco, *Ctenomys magellanica*, as engaged with commendable industry, he drove his little tunnel just beneath the surface, ever onward in search of those nutritious roots and succulent tubers upon which he feeds. These little fossorial rodents seemed especially active in the early morning and late afternoon and evening, During these hours, in localities especially favorable to them, they would be constantly heard, though a careful watch throughout our stay in Patagonia, kept at frequent intervals in order to observe their habits above ground, was only rewarded by a momentary glimpse, on one or two occasions, of a solitary individual, as he appeared for an instant at the mouth of a burrow. On one occasion, however, while walking rapidly along, I came suddenly upon one of these little animals in the grass at a distance of several feet from the mouth of his burrow. The manner in which he ran aimlessly about in search of his hole, with the nose close to the surface of the ground, seemed to indicate, not only that he had lost his way and become bewildered by the grass, which, to him, had all the appearances of a great forest, but that he depended quite as much, if not more, upon his sense of smell as that of sight, while endeavoring to regain the abandoned burrow. Hardly had he entered the latter when the frightened condition under which he had been so evidently laboring while above ground, suddenly and completely disappeared, and he stopped long enough to send back a rapid volley of deep, guttural notes, uttered in defiance at the intruder, who, far from having cherished any sinister designs against the little creature, had only been delighted with this opportunity, brief though it was, of observing him above ground. The entire attitude of the little animal was such as to convince me that his surroundings while above ground, aside from my presence, were distinctly uncongenial, and that he was in every respect especially modified and adapted for a subterranean life, a conclusion which I had previously reached upon observing the small eyes, powerful fore-limbs, and feet well adapted for burrowing, and other anatomical characters common to animals of more or less subterranean habits."

CTENOMYS COLBURNI Allen.

(Plate VIII, Figs. 3 and 4, Skull.)

Ctenomys colburni Allen, Bull. Am. Mus. Nat. Hist., XIX, 188, May 9, 1903. Arroyo Aike, in the Basalt Cañons, fifty miles southeast of Lake Buenos Aires, Patagonia.

Similar to *C. sericeus* but larger, much more strongly suffused with fulvous and less varied with black.

Measurements.—Type: Total length, 230 mm.; tail vertebræ, 65; hind foot, 29. Fifteen males measure as follows: Total length 224.5 (210–240, with one at 245 and one at 250); tail vertebræ, 69 (60–75, with two at 80); hind foot, 30 (28–32, and one at 33). Seventeen females: Total length, 213 (200–225); tail vertebræ, 62.2 (60–65); hind foot, 29.5 (29–31).

Skull.—Type, total length, 43; basal length, 39; zygomatic breadth, 25; mastoid breadth, 25; interorbital breadth, 8.5; length of nasals, 14.3; palatal length, 20; diastema, 6; upper molar teeth, 8; lower jaw, inner base of incisors to posterior border of condyles, 28.5; inner base of incisors to point of angular process, 33.5; height at condyle, 8; width between condyles, 16; width between points of angular processes, 27; lower molar teeth, 8.5. Seven old male skulls measure: Total length, 43 (41–45); zygomatic breadth, 24.3 (23.5–25.3) Fifteen old female skulls: Total length, 38 (36–41); zygomatic breadth, 22.2 (21–24).

Represented by 33 specimens—16 males and 17 females—all adult except 3, and all collected by Mr. Colburn, of which 16 were taken in the basalt cañons, fifty miles southeast of Lake Buenos Aires, April 2 to 26, and the remaining 17 at Swan Lake, April 2 to May 17.

Aside from the young specimens, which are grayer and much less fulvous than the adults, the variation in color consists in some specimens being a little more strongly suffused with yellowish than others, and in the distinctness of the tail stripe, which is often wholly wanting, or present in varying degrees from a faint trace to a broad black stripe.

This species is intermediate in size between *C. sericeus* and *C. mendocina*, being larger than the former, and differing from it in its more strongly fulvous and generally lighter coloration, and from the latter in considerably smaller size and entire absence of any reddish suffusion.

It is of interest to note that this species was not obtained by Mr. Peterson in the foothills of the Andes, on the upper Rio Chico, where, however, he found a much larger species (*C. robustus*) abundant, and also obtained, in the same region, a small series of a very much smaller species (*C. sericeus*). In all probability *C. colburni* will be found to be a plains or pampa species, while the others occupy the alluvial river valleys in the foothills of the Andes.

Family *MURIDÆ*.

The Murine fauna of southern Patagonia is as strongly characterized by the types that are absent as by those that are present. The Voles, or the great subfamily Microtinæ, are of course absent, as are also all the characteristic North American genera of the Cricetinæ, as *Peromyscus*, *Onychomys*, *Neotoma*, *Reithrodontomys*, and *Sigmodon*, although all extend into tropical America, and all but *Onychomys* even reach the northern border of South America. Another set of genera, as *Rhipidomys*, *Nectomys*, *Holochilus*, and *Tylomys*, which range over a large part of Central and South America, do not reach even the northern border of Patagonia. Of the seven prominent Patagonia genera — *Euneomys*, *Reithrodon*, *Phyllotis*, *Eligmodontia*, *Oxymycterus*, *Oryzomys*, and *Akodon* — only the last two have a wide distribution to the northward, except in the Andean region, where nearly all are highly developed. The single genus *Notiomys* is thus far known only from the original specimen taken near Santa Cruz. It is closely related to *Eligmodontia* and certain forms of *Akodon* (subgenus *Chelymys*), types that abound over the pampean districts of Argentina and Bolivia.

Genus MUS Linnæus.

In America the genus *Mus*, a strictly Old World type, is of course represented only by introduced species, three or four of which have become almost universally dispersed over both continents, and may all occur in Patagonia, although satisfactory evidence of this is at present lacking.

Mus rattus Linn. Black Rat.

The collection contains a single specimen (a half grown female) collected at Punta Arenas, December 30, 1897, by Mr. E. A. Colburn. The measurements as recorded by the collector are: "Length, 280; tail, 150; hind foot, 32."

In coloration this specimen is very different from the black rats of the northern United States, being blackish olive gray instead of black, but it can be matched exactly in specimens of corresponding age from Jupiter Inlet, Florida, and from the Island of Trindad, B. W. I., but in both cases these specimens are *Mus rattus* more or less mixed with *M. alexandrinus*, to which category the Punta Arenas specimen doubtless belongs.

The Black Rat (*Mus rattus* Linn.) and the White-bellied or Roof Rat (*Mus alexandrinus* Geoffroy) are widely dispersed in the warmer parts of America, and at many localities hybridize freely, so that specimens of pure strain of either species are rare. In the northeastern United States the Black Rat was formerly an abundant inhabitant of houses and outbuildings in the farming districts, while the Brown or Wharf Rat (*Mus norvegicus* Erxleben = *Mus decumanus* Pallas) swarmed in the cities, particularly about wharves and in warehouses. The latter is not only larger and more powerful than the black rat, but antagonizes it, and has to a large extent driven it out or exterminated it in the New England and Middle States of the Union. In the South Atlantic States the Roof Rat has long been the prevailing species, where it seems to have become widely distributed.

From Mexico, Central America and in northern South America both *M. rattus* and *M. alexandrinus* are often received in collections, being caught in traps, in fields and wooded areas remote from settlements, by collectors in trapping for the indigenous rats of the country. In the Province of Chiriqui, Panama, Mr. J. H. Batty in this way unwittingly collected a very large series of *Mus rattus;* but, as already said, hybrids of *M. rattus* and *M. alexandrinus*, combining in endless variety the characteristics of both species, are widely dispersed in tropical America.

The common House Mouse (*Mus musculus* Linn.), although not represented in the present collection, doubtless also occurs in Patagonia, as it is the most widely dispersed in America of any of the introduced species of *Mus*. Darwin obtained it on East Falkland Island and at Maldonado. It has found its way to subarctic America, in Alaska and the remote interior of northern British Columbia. It is at home, thence southward everywhere, under the widest possible conditions of environment. Almost every collection of small mammals, whether made in the arid regions of our great Southwest, the swampy districts of the Gulf Coast, the hot lowlands of Mexico, Central and South America, or at high altitudes in the Peruvian Andes, contains specimens of this omnipresent pest. It will be of interest soon to secure large series of specimens from widely separated localities where it has been long established for the purpose of determining what modifications it may have undergone through the influence of very diverse conditions of environment. That strongly-marked differentiation will be obvious is evident from what is already known to have taken place among these mice inhabiting the fields in the vicinity of Jalapa, Mexico, where a well-marked black phase (*Mus musculus jalapæ* All. & Chapm.) has already been developed.[1]

Genus ORYZOMYS Baird.

Oryzomys Baird, Mamm. N. Am., 1858, 458 (as a subgenus of *Hesperomys*). Type and only species, *Mus palustris* Harlan.

Zygodontomys Allen, Bull. Am. Mus. Nat. Hist., IX, 38, pl. i, figs. 1–7, March 11, 1897. Type, *Oryzomys cherriei* Allen. Described as a genus, but more commonly treated as a subgenus of *Oryzomys*.

Oligoryzomys Bangs, Proc. N. Engl. Zoöl. Club, I, 94, Feb. 23, 1900 (as a subgenus of *Oryzomys*). Type, *Oryzomys navus* Bangs.

Erioryzomys Bangs, Proc. N. Engl. Zoöl. Club, I, 96, Feb. 23, 1900 (as a subgenus of *Oryzomys*). Type, *Oryzomys monochromos* Bangs.

Melanomys Thomas, Novitates Zoolog., X, 41 (in text), April, 1903 (as a subgenus of *Oryzomys*). Type, *Oryzomys phæopus* Thomas.

The genus *Oryzomys*, as commonly recognized, is the most abundant and most widely distributed genus of American Muridæ, it ranging from the warmer parts of the southeastern United States to Tierra del Fuego. Altogether about 185 species and subspecies have been referred to it, and the list is still rapidly increasing by the discovery and description of additional forms. Although the group is far from homogenous, the transitions from one type to another are usually by gradual stages. In size the various species range from the size of a house mouse to that of the large brown rat; the tail may be much more than half the total length of the animal or less than one quarter; the supraorbital ridges may be heavily developed or obsolete; and the enamel pattern of the teeth is quite variable. As shown in the synonymy above, several minor groups have been set off as subgenera, with fairly well marked characters, and, owing to the numerical unwieldiness of the genus, it will probably be found convenient, sooner or later, to employ them in the sense of full genera.

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[1] *Cf.* Bull. Am. Mus. Nat. Hist., IX, 1897, p. 198.

Only two species, both apparently belonging to the typical section of the genus, are thus far known from Patagonia, where they are restricted to its extreme southern part.

ORYZOMYS MAGELLANICUS (Bennett).

(Plates IX, Fig. 2, Skull; X, Figs. 4 and 5, Teeth.)

Mus magellanicus Bennett, P. Z. S., 1835, 191, Port Famine, Straits of Magellan. — Waterhouse, Zoöl. Voyage Beagle, Mamm., 1839, 47, pl. xiv, animal, pl. xxiv, fig. 6, molar teeth. — Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zool., Mamm., 1890, 20, Orange Bay.

Hesperomys (*Calomys*) *magellanicus* Burmeister, Descr. phys. Rép. Argent., III, 1879, 226 (ex Bennett and Waterhouse).

[*Akodon*] *magellanicus* Trouessart, Cat. Mamm., ii, 1897, 536, ex Bennett and Waterhouse.

? *Hesperomys* (*Oryzomys*) *longicaudatus* Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zool., Mamm., 1890, 27, pl. iv, fig. 1, animal.[1]

Adult (February). — Above yellowish brown, varied with black-tipped hairs, brighter on the top of the head, and middle and posterior part of the back, and paler on the sides; ventral surface buffy white, varying in different specimens from nearly clear white to strong buff; front of head yellowish gray strongly varied with black; ears of medium size, dusky, very thinly haired; upper surface of feet flesh-color; tail very long, dusky brown, a little darker above than below, and very thinly covered with short, bristly hairs, not concealing the annulations.

Young, one fourth to half grown, in soft woolly pelage, are duller and less suffused with fulvous.

Measurements. — Six adult males: Total length, 216 mm. (202–225); tail vertebræ, 120 (114–125); hind foot, 29.3 (28–30). Adult male skull: Total length, 26; basal length, 21; greatest breadth of brain case, 12; interorbital breadth, 3.6; length of nasals, 9.5; palatal length, 19; diastema, 6; palatal foramina, 5.5; upper molar series, 4.

Represented by 17 specimens, of which 10 are adult and 7 young. They were all, except one, collected by Mr. Peterson in the Cordilleras at the head of the Rio Chico, four (all immature) being marked as from the Pacific Slope; they were all taken between February 14 and March 14, 1897. The other specimen is from Punta Arenas, collected by Mr. Colburn, Jan. 1, 1898.

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[1] Mr. Oldfield Thomas, in reply to my inquiry respecting the inclusion of this species by Milne-Edwards, kindly informs me that this was probably an error, and that "the specimens were really *Oryzomys magellanicus*."

This species has not been previously recorded from north of Orange Bay and Port Famine, the latter being the type locality. The present material extends its known range along the Cordilleras to about latitude 48°.

ORYZOMYS COPPINGERI (Thomas).

Hesperomys (*Calomys*) *coppingeri* Thomas, P. Z. S., 1881, 4, figs. 1, 2, ear and foot. Tom Bay, Cockle Cove.—Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zoologie, Mamm., 1890, 26, pl. iv, fig. 2, animal, pl. viii, fig. 2, skull. Orange Bay, Tierra del Fuego.

[*Oryzomys*] *coppingeri* Trouessart, Cat. Mamm., ii, 1897, 529 (ex Thomas and Milne-Edwards).

This species is unrepresented in the present collection. Following is Mr. Thomas's original description of the species, which has since been reported by Milne-Edwards from Orange Bay, southern Tierra del Fuego, where he says the naturalists of the Mission Scientifique du Cap Horn (Mamm., p. 26) found it very common and captured a large number of them.

"HESPEROMYS (CALOMYS) COPPINGERI, sp. nov.

"A skin from Tom Bay, and two specimens in spirit 'caught with trap on a wooded islet about one acre in extent' in Cockle Cove (Feb. 9, 1879).

"Fur very long and soft, fully half an inch in length on the back. Ears rather short, nearly hidden in the fur. Whiskers of medium length, the shorter lower ones forming a thick shining white fringe along the upper lip. On the head and back the wool-hair is of a deep slaty blue for nine tenths of its length; then follows a subterminal band of yellow; and the extreme tip is black. Mixed with this wool-hair there are a considerable number of longer black hairs, the resulting general colour being very similar to that of the common Water-Vole (*Arvicola amphibius,* L.). The dark color of the upper side extends on the limbs to the wrists and ankles, the feet being covered with short shining white hairs. The ears are thickly clothed with short woolly hairs similar in colour to the fur of the back. On the sides the yellow tips of the hairs gradually become lighter, and on the belly they are nearly pure white, the basal portion of the fur, however, from the chin to the anus, still being slate-coloured.

"The tail is very long and but scantily haired; on the upperside the scales are grey and the hairs dark reddish brown, on the lower the scales are pale yellow and the hairs white; along the centre of the underside, however, there is a distinct narrow line of dark-brown hairs, contrasting with the white ones on either side.

"The ears possess, at about one third the height of the inner margin, a small projecting lobule, which seems to be present in many species of this genus, and to be well worthy of notice, as being very constant in the species in which it is found. The foot-pads are small but distinct, and the surface of the palms and the distal half of the soles are coarsely granulated, as shown in the woodcut.

"The skull is that of a typical *Hesperomys*, but shows only a very faint trace of the supraorbital ridges supposed to be characteristic of the subgenus *Calomys*, to which, however, the species undoubtedly belongs, as proved by its long tail and murine form.

"The following are the dimensions of the two spirit specimens, both of which are adult males:

	a. Inches.	*b.* Inches.
Length of head and body	4.3	4.2
Length of tail	6.4	6.1
Length of head	1.4	
Length of ear	0.55	0.53
Length of hind foot without claws	1.3	1.22
Distance from muzzle to ear-orifice	1.08	

"Measurements of skull of *b*:

	Inch.
Length	1.2
Breadth	0.65
Breadth between orbits	0.16
Length of nasals	0.4
Length of lower jaw from condyle to tip of incisors	0.76

"The species to which *H. coppingeri* appears most nearly allied are *H. lutescens*, Gay, and *H. philippii*, Landb., both from Chili. The first, however, is much larger, being 5.7 inches in length, while its tail is only as long as the trunk. Moreover the skull, as figured by Gay, possesses strong supraorbital ridges, while our three specimens of *H. coppingeri*, as stated above, show but little trace of them. *H. philippii*, though somewhat similar in size and colour, may be readily distinguished by the extreme shortness of its tarsus (0.8 in.); and by the character of its fur, which is described as being short and fine, while that of *H. coppingeri*, as mentioned above, is particularly long and soft." (Thomas, *l. c.*)

Genus ELIGMODONTIA F. Cuvier.

Eligmodontia F. Cuvier, Ann. Sci. Nat. (2), VII, 1837, 168. Type, *Eligmodontia typus*, sp. nov.

Heligmodontia Agassiz, Nomen. Zool., Mamm., Addenda, 5, 1846. Emendation of *Eligmodontia* F. Cuvier.

Eligmodon Thomas, Ann. & Mag. Nat. Hist. (6), XVIII, Oct., 1896, 307. Emendation of *Eligmodontia* F. Cuvier.

Calomys Waterhouse, P. Z. S., 1837, 21 (as a subgenus of *Mus*). Type, *Mus bimaculatus* Waterhouse. Preoccupied by *Callomys* D'Orbigny & Geoffroy.

Callomys Gray, List Mamm. Brit. Mus., 1843, 112 (as a full genus). = *Calomys* Waterhouse.

Hesperomys Waterhouse, Zoöl. Voy. Beagle, pt. ii, Mamm., 1839, 75. No type; proposed to include, apparently, all the New World Muridæ except the Voles and the genus *Neotoma*, or the "Sigmodontinæ." *Mus bimaculatus* was specifically used in defining the characters of *Hesperomys*, and if this species be taken as the type, as it is quite proper to do, *Hesperomys* becomes a synonym of *Calomys* Waterhouse, 1837 (*nec Callomys* D'Orbigny & Geoffroy).

The genus *Eligmodontia* includes at present about 20 commonly recognized species and subspecies. Its range extends from southern Patagonia northward to southwestern Brazil and Bolivia, east of the Andes, and in the Andean region north at least to central Peru. Its metropolis, or area of greatest abundance, includes Argentina, Paraguay, and Bolivia. Four species have been recorded from the region here under consideration, but only one is represented in the Princeton University Patagonian collections.

Eligmodontia and *Phyllotis* appear to be inosculant groups, but lack of material at present writing prevents a satisfactory investigation of the matter. In 1901[1] I felt convinced that the *griseoflava* group was better referable to *Phyllotis* than to *Eligmodontia*, taking *E. typus* and *E. morgani* as the standard for *Eligmodontia*, and *Phyllotis darwini* and *P. xanthopygus* as the standard for *Phyllotis*. As, however, Mr. Thomas, with far better means at hand for reaching a correct conclusion, prefers the association of the *griseoflava* group with *Eligmodontia*, this course is reluctantly followed in the present connection, as *griseoflava* was one of the three species originally referred by Waterhouse to his subgenus *Phyllotis*.

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[1] Bull. Am. Mus. Nat. Hist., XIV, p. 408, Nov. 39, 1901.

ELIGMODONTIA TYPUS F. Cuvier.

Eligmodontia typus F. Cuvier, Ann. des Sci. Nat., sér. ii, VII, Mars 1837, 168, pl. v, animal, skull, dentition, and intestinal canal. "Environs de Buenos Aires." — Trouessart, Cat. Mamm., ii, 1897, 532. — Lahille, Congr. Cien. Lat. Amer., III, 1899, 186.

Mus elegans Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 19, Bahia Blanca; Zoöl. Voy. Beagle, Mamm., II, 1839, 41, pl. xii, animal, pl. xxxiv, fig. 2, skull and teeth.

Hesperomys elegans Burmeister, Descrip. phys. Rép. Argent., III, 1879, 220, Rio Chubut, collected by Durnford.

Eligmodontia elegans Thomas, P. Z. S., 1898, 210. Chubut, East Patagonia.

This species is not represented in the present material, but has been recorded from Tomba Point, on the coast, about 60 miles below the mouth of the Rio Chubut. The following description is transcribed from Waterhouse, it being more detailed and satisfactory in form than that given by F. Cuvier, which has a few months' priority of publication.

"Fur very long and soft; general colour of the upper parts of the body pale brownish yellow; the lower portion of the cheeks, and the under parts of the body pure white; the hairs of the ordinary fur of the back are gray at the base, pale ochre near the apex, and brown at the apex; the longer hairs are brownish. On the sides of the body where the longer hairs are less numerous, the pale ochre colour prevails; the hairs on this part as on the back are deep gray at the base, but at a short distance from the apex they are white; nearer the tip shaded into yellow, and at the tip brownish: the limbs externally are of a pale yellow colour. The hairs of the throat and chest are pure white to the root, those on the belly are obscurely tinted with gray at the root. The feet are of a pale flesh-colour, and furnished with white hairs; the fore feet are of moderate size; the thumb nail is small and rounded, and the carpal tubercle is covered with hairs; the tarsi are long, and the white hairs extend over the whole of the under parts; the under side of the toes, however, are but sparingly furnished. There appears to be but one large tubercle on the under side of the tarsus, and this, which is situated near the base of the toes, is thickly covered with silvery-white hairs. The tail is long, pale brown above, and pale flesh-colour beneath; above, it is furnished with minute brown hairs, and on the under side with white hairs. The ears are rather large, of a pale flesh-colour tolerably well clothed with hairs, which are of a pale yellow colour on the inner side, and white on the outer side—excepting on the fore part, where they are brown. A small tuft of white hairs springs from the base of the ear posteriorly. The hairs of the moustaches are moderate; black at the base, and grayish at the apex.

	Inches.	Lines.	[mm.]
" Length from nose to root of tail	3	7	91
Length of tail	3	9	44.8
Length from nose to ear	1	0	25.4
Length of tarsus	0	10	21
Length of ear	0	6	12.7

"Habitat, Bahia Blanca (September)."—Waterhouse, Zoöl. Voy. Beagle, *l. c.*

Based on a single specimen, collected by Darwin, who says: "Whilst bivouacking one night on shore, amongst some sand hillocks, this mouse, with its tail singed, leapt out of a bush which was placed on the fire. Its hind legs appeared long in proportion to the front, and it did not appear to be very active in endeavouring to make its escape."

Mr. Durnford, in his field notes on this species, published by Mr. Thomas (*l. c.*) says: "Not uncommon among bushes, into which it climbs readily. Comes out in the evening to feed. Like the long-tailed Rat [*Eligmodontia griseoflava*] this species is most numerous in the summer, though during the winter a few may be found. It does not enter the house like its large relative, but is extremely numerous in the thick scrub and brushwood in the neighborhood of the Colony, and universally distributed. It makes a small oval nest of fine grass and any soft material, which it places in the centre of a thick bush. It never burrows in the ground, but is extremely numerous among the thorn-bushes."

F. Cuvier's name *typus* for this species appears to have unquestionable priority over *elegans* of Waterhouse, the signature date of Cuvier's paper on *Eligmodontia* being March, 1837, while the signature of the Proceedings of the Zoölogical Society containing Mr. Waterhouse's paper was not delivered to the Society by the printer till Nov. 21, 1837. (*Cf.* Sclater, P. Z. S., 1893, 437.)

ELIGMODONTIA MORGANI Allen.

(Plates IX, Fig. 1, Skull; X, Figs. 2 and 3, Teeth.)

Eligmodontia morgani Allen, Bull. Am. Mus. Nat. Hist., XIV, 409, Nov. 30, 1901. Basaltic Cañons, 50 miles southeast of Lake Buenos Aires, Patagonia ("Arroyo Else" on the labels and in the original description).

Pelage very full, long and soft. Above dull ochraceous gray, finely lined with black, sides paler and more buffy, passing into a well-defined pale yellowish lateral line, extending from the sides of the nose to the base of the tail; lower parts pure white, the fur plumbeous at base, the apical half white; ears medium, dusky brown externally, pale buffy gray internally; tail nearly as long as head and body, sharply bicolor, dark brown above, grayish white below, well haired and slightly penicillate; fore and hind feet above grayish white, well covered with short hairs; soles and palms flesh color, sparsely haired, the flesh-colored skin barely showing through the hairs.

Measurements.—Total length (of type), 165 mm.; head and body, 85; tail, 80; hind foot, 23; ear (from dry skin), 13.

Different specimens, apparently adult or nearly so, vary greatly in measurements, as shown by the following: Nine topotypes, all males but one, collected and measured by Mr. Colburn: Total length, 153 (145–165); tail vertebræ, 72.5 (65–80); hind foot, 22.5 (22–23). Five (2 males and 3 females) from the upper Rio Chico, collected and measured by Mr. Peterson: Total length, 165 (148–180); tail vertebræ, 77 (70–84); hind foot, 23 (21–24). Seven specimens from Cape Fairweather and vicinity (all males but one), collected and measured by Mr. Peterson: Total length, 150 (144–170); tail vertebræ, 69.4 (66–77); hind foot, 22.5 (22–24).

Skull much as in *E. typus*, but rather smaller, and with the same character of dentition. Total length (type), 24; basilar length, 17.5; zygomatic breadth, 12; mastoid breadth, 11; interorbital breadth, 4; length of nasals, 10; palate, 5; palatal foramina, 5 x 2; interparietal, 11 x 2.5; upper toothrow, 4; lower jaw, 12; height at condyle, 5.3; lower toothrow, 4.

This species is represented by 48 specimens, of which 17 are from the coast and 31 from the interior, and among the latter are several quite young, taken in March. The coast specimens were all collected by Mr. Peterson, as follows: Gallegos River, 2 specimens, May 23; Halliday Ranch, 1 specimen, June 24; Coy Inlet, 5 specimens, August 29–31, and November 3–9; Cape Fairweather, 8 specimens, July 11–13. Of the interior specimens, 11 were collected on the upper Rio Chico, by Mr. Peterson, January 31 to February 8 and March 1; 13 are from Basalt Cañons, the type locality, collected by Mr. Colburn, April 4–29; and 8 (mostly quite young) from Swan Lake, collected by Mr. Colburn, March 12–21.

Only about one third of the specimens, or perhaps less, can be considered as fully adult; the others range from one fourth to one half grown, and the remainder from one half grown to nearly full-sized young adults. The younger specimens are darker, grayer, and less fulvous than the adults. The old adults are quite strongly fulvous on the sides as compared with the middle-aged and young adults, as shown by both the upper Rio Chico specimens and the coast series. No. 84216, an old male, "Upper Rio Chico, near Cordilleras, Feb. 3, 1897," is the palest and most fulvous example of all, but seems to be merely an unusually light colored and very fulvous extreme of the series and not specifically different.

This species has externally the appearance of a small-eared *Phyllotis*. Its nearest known ally appears to be *E. typus* (*elegans* Waterhouse), from which it differs in having much smaller ears and shorter tail, the foot and body being nearly as in *E. typus*.

The type of *E. elegans* was collected by Darwin at Bahia Blanca and is much changed in color by exposure for a long time as a mounted specimen. Two other specimens in fair condition from Chubut, eastern Patagonia, identified as *E. elegans* by Mr. Thomas, very closely resemble in color the series of *E. morgani*, but differ from them strikingly in their much larger ears and much longer tails. There are no flesh measurements, but the vertebræ still remain in the tail and the skins are fairly well made up.

ELIGMODONTIA GRACILIPES (Waterhouse).

Mus gracilipes Waterhouse, P. Z. S., 1837 (November 21, 1837), 19 (Bahia Blanca); Zoöl. Voy. Beagle, Mamm., II, 1839, 45, pl. xi, animal, pl. xxiv, fig. 4, skull, teeth and under side of tarsus.

Eligmodontia gracilipes Trouessart, Cat. Mam., ii, 1897, 532.—Thomas, P. Z. S., 1898, 211, Chubut, East Patagonia.

This species was described by Waterhouse from a single specimen obtained by Darwin at Bahia Blanca. It has since been recorded by Thomas from Chubut, East Patagonia, and therefore must be included in the present work. Mr. Waterhouse's description, in his account of the Mammalia of the voyage of the *Beagle*, is as follows:

"General color pale yellowish brown, a tint produced by the admixture of black and pale fawn colour; the hairs of the ordinary fur being of the latter tint near the apex, and dusky at the apex, whilst the longer hairs are black. The feet, tail and under parts of the body and sides of the muzzle, are pure white. All the hairs of the body (which are soft, and of moderate length), are deep gray at the base. The ears are of moderate size, well clothed with hairs, of which those on the inner side are yellowish, and those on the outer are brown on the anterior part, and white on the posterior. A small tuft of white hairs springs from the neck immediately behind the ears; this tuft is hidden when the ears are folded back. The tail is slender and short (being not quite equal to the body in length) of a pale flesh-colour, and sparingly furnished with minute white hairs. The feet are very small and slender, and the naked parts are of a flesh-colour. The sole of the foot is covered with hairs; the toes beneath and the tubercles (which are as in *Mus Musculus*), however, are naked. The hairs of the moustaches are of moderate length, and of a blackish colour, some of them, however, are grayish white.

	Inches.	Lines.	[mm.]
"Length from nose to root of tail	2	10	[53]
Length of tail	1	7	[40]
Length from nose to eye	0	4⅓	[9.1]
Length from nose to ear	0	8¼	[15]
Length of tarsus (claws included)	0	6½	[14]
Length of ear	0	4¼	[9]

"Habitat, Bahia Blanca (September)."

Mr. Durnford (*cf.* Thomas, *l. c.*) refers to this species as less common at Chubut than the other species of *Eligmodontia* found there, and that it "makes its nest in a thick bush about a foot above the ground and of grass torn into fragments."

ELIGMODONTIA GRISEOFLAVA (Waterhouse).

Mus (*Phyllotis*) *griseoflavus* Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 28, Rio Negro.

Mus griseoflavus Waterhouse, Zoöl. Voy. Beagle, Mamm., II, 1839, 62, pl. xxii, animal, pl. xxxiv, fig. 16, skull and teeth.

Hesperomys griseoflavus Burmeister, Descrip. phys. Rép. Argent., III, 1879, 219. Rio Chubut, collected by Durnford.

Eligmodontia griseoflava Thomas, P. Z. S., 1898, 210. Chubut, East Patagonia.

Phyllotis griseoflavus Trouessart, Cat. Mamm., 1897, 534.—Lahille, Congr. Cien. Lat. Amer., III, 1899, 187.—Allen, Bull. Am. Mus. Nat. Hist., XIV, 1901, 408.

This species is recorded from Chubut by Mr. Thomas (*l. c.*), and thus comes within the region included in the present work. The following is a transcript of Waterhouse's description in the Mammalia of the Voyage of the *Beagle.*

"Ears large; tail rather shorter than the head and body taken together; tarsi slender, and moderately long; fur long and very soft; general tint of the upper parts of head and body grayish, washed with brownish yellow; on the sides of the body a palish yellow tint prevails; feet, chin, throat, and under parts of body pure white; tail rather sparingly clothed with hairs, those on the apical portion rather long, and forming a slight pencil at the tip; on the upper side and at the tip of the tail the hairs are brown, on the under side they are dirty white; the ears are very sparingly clothed with minute brownish yellow hairs internally; externally, on the fore part, the hairs are rather longer and of a brown colour; the upper incisors are orange, and the lower incisors are yellow; the hairs of the moustaches are long, and of a black colour; the hairs of the back are deep gray at the base, brownish at the tip, and annulated with pale brownish yellow near the tip; the longer hairs are brown; the hairs of the belly are white externally, and gray at the base; on the throat the hairs are white to the root.

	Inches.	Lines.	mm.
"Length from nose to root of tail	6	8	168
Length of tail	5	6	140
Length from nose to ear	1	4½	35.3
Length of tarsus (claws included)	1	2½	30.8
Length of ear	0	8	16.8

"Habitat, Northern Patagonia (August)."

Darwin adds: "Inhabits the dry gravelly plain, bordering the Rio Negro."

Respecting the reference of this species to the genus *Eligmodontia* instead of to *Phyllotis*, Mr. Thomas observes:

"I have long realized that the animal commonly known as '*Phyllotis*' *griseoflavus* has so different a skull from that of the typical species of *Phyllotis*, that it could not be considered as really congeneric with them. But, on the other hand, its cranial characters are by no means so different from those of the long-tailed species of *Eligmodontia;* and rather than make a new generic term for it I refer it to that genus, in which it bears to the other species about the same relative proportion in size as *Mus rattus* does to *M. musculus*."

The enamel pattern of the teeth, however, is quite different from that of the typical species of *Eligmodontia*, and the teeth themselves are more hypsodont, as in *Phyllotis*. Externally and in the large size there is also a close agreement with *Phyllotis*.

Mr. Durnford gives the following account (*cf.* Thomas, *l. c.*) of the habits of this species as observed by him near the mouth of the Rio Chubut:

"This Rat is only found close to the Colony [Chubut] in the summer, but at that season it overruns many of the houses and is extremely destructive, eating boots, calico, etc., and is especially fond of gnawing the metal spouts of teapots. What becomes of it in the winter I do not know, but I believe it lies dormant under the scrub and brushwood. It never burrows in the ground, but lives under old logs, bushes, etc., and the female makes a nest, generally in the centre of a thick bush of bark stripped into fine shreds and any soft material it can find. It can jump and climb with great agility."

The *Eligmodontia* (*seu Phyllotis*) *griseoflava* group ranges northward from southern Patagonia over the chaco and pampa regions of Argentina, Paraguay, and Bolivia, and includes *E. griseoflava domorum* Thomas from Tapacari, *E. g. centralis* Thomas from central Cordova, *Phyllotis chacoënsis* Allen from the chaco boreal of Paraguay, and *P. cachinus* Allen from the upper Cachi River, Argentina. These are all closely related and may be merely local forms or subspecies of *griseoflava*, as considered by Mr. Thomas.[1]

Genus PHYLLOTIS Waterhouse.

Phyllotis Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 28 (as a subgenus of *Mus*). No type designated.

Phyllotis Fitzinger, Sitzungsb. Math.-Nat. Cl. K. Akad. Wiss. Wien, LVI, 1867, 83 (as a full genus).

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[1] Ann. & Mag. Nat. Hist. (7), IX, April, 1902, p. 241.

Phyllotis Thomas, P. Z. S., 1884, 449 (as a subgenus of *Hesperomys*). *Mus* (*Phyllotis*) *darwinii* Waterhouse designated as type.

Phyllotis, on the one hand, closely approaches *Eligmodontia* (see *antea*, p. 50), and on the other is not very sharply separable from *Reithrodon*, through such species as "*Phyllotis*" *boliviana* and "*Reithrodon*" *pictus*. About 20 to 25 species and subspecies have thus far been assigned to the group, which has about the same geographical range as *Eligmodontia*, namely, from southern Patagonia northward over the plateau region east of the Andes to northern Bolivia, and through the Andean region north to Ecuador. The two Patagonian species here included were both described by Waterhouse in 1837 from specimens collected by Darwin, and are both well represented in the Princeton University Expedition collections.

PHYLLOTIS XANTHOPYGUS (Waterhouse).

(Plates XIII, Fig. 1, Skull; XIV, Figs. 2 and 3, Teeth.)

Mus (*Phyllotis*) *xanthopygus* Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 28. Santa Cruz, Patagonia.

Mus xanthopygus Waterhouse, Zoöl. Voyage Beagle, Mamm., 1839, 63, pl. xxii, animal, pl. xxxiv, fig. 16, teeth.

Hesperomys (*Calomys*) *xanthopygus* Burmeister, Descript. phys. Rép. Argent., III, 1879, 225 (ex Waterhouse.)

Hesperomys (*Phyllotis*) *xanthopygus* Milne-Edwards, Mission Scient. du Cap Horn, VI, Zool., Mamm., 1890, 20, pl. vi, fig. 2, animal. Santa Cruz, Patagonia.

Phyllotis xanthopygus Trouessart, Cat. Mamm., ii, 1897, 534 (ex Waterhouse and Thomas).—Lahille, Congr. Cien. Lat. Amer., III, 1899, 187.

Adult (November). — Pelage very soft and very long and full. General color above, from the eyes posteriorly, dull brown varied with black-tipped hairs and faintly suffused with buff or pale fulvous, darkest over the median area, the sides more buffy and less dark, passing into a strong buff lateral line, indistinct above; ventral surface whitish (under fur dark plumbeous, scarcely showing at the surface), faintly washed in most specimens with very pale buff, giving the general effect of soiled yellowish white; whole front of head from a point midway between ears and eyes gray, varied with black-tipped hairs; hairs at base of tail rusty fulvous; ears large, dark brown, rather thinly furred; upper surface of feet whitish, palms and soles flesh-color; tail about one half the total length, generally well haired, especially on the apical half, and penicillate, bicolor, brown above and whitish below.

Adult (February to April).—The pelage is thinner, grayer and darker, with less fulvous suffusion throughout, and the fulvous lateral line very indistinct, evidently from fading.

Young Adults (March and April).—Above dark gray, strongly varied with blackish, and very faintly suffused with fulvous; lower border of sides tinged more or less strongly with fulvous, sometimes forming a poorly defined lateral band; ventral surface gray, sometimes without fulvous wash, or varying from a faint buffy pectoral spot to a large strongly buff area occupying most of the ventral surface.

Measurements.—Six old males (from Basaltic Cañons) measure: Total length, 235 mm. (230–250); tail vertebræ, 115 (110–125); hind foot, 30 (29–30). Four old females measure: Total length, 236 (225–242); tail vertebræ, 115 (110–119); hind foot, 30.6 (28–31). Young adults range in total length from about 205 to 225, with a tail length of 100 to 110. Five adults from the coast (mouth of Rio Coy, all males except one) measure: Total length, 240 (230–247); tail vertebræ, 114.5 (105–116); hind foot, 30.6 (28–32).

An average fully adult skull measures: Total length, 32; basal length, 27; zygomatic breadth, 16.5; width of braincase, 14; interorbital breadth, 4; palatal length, 14; palatal foramina, 7.5; diastema, 8; upper molar series, 5.

Represented by 24 specimens, of which about 17 are fully adult, the rest being more or less immature. Five (3 adults and 2 young) were taken on the upper Rio Chico in February; 5, all adults, at the mouth of the Rio Coy, Nov. 6–10; 6 (mostly immature) at Swan Lake in March, and 9 at the Basaltic Cañons in April. As noted above, they represent three distinct phases of pelage, two of which are seasonal and the other the adolescent stage. The Rio Coy series represents full winter pelage, and the upper Rio Chico series the summer pelage; the Swan Lake and Basaltic Cañons specimens are in the early fall pelage (March and April), and differ strikingly from Rio Coy specimens, taken in November.

Mr. Waterhouse states (Voy. Beagle, *l. c.*) that there were three specimens of this species collected by Mr. Darwin; the specimen in the British Museum, designated as the type, is a rather young individual, and is in the phase of pelage corresponding to the present March and April specimens taken on the plains at the eastern base of the Andes.

Mr. Darwin says of this species (Voy. Beagle, *l. c.*): "Extremely abundant in the coarse grass and thickets in the ravines at Point Desire and Santa Cruz; was caught in a trap baited with cheese."

Mr. Peterson says that the Rio Coy specimens were collected "around a large spring, in heavy grass and brush"; and that the upper Rio Chico specimens were taken "in the Rio Chico valley, close to the river."

Phyllotis xanthopygus, in the full brown pelage of winter, bears a strong resemblance in coloration to *P. micropus*, but it is considerably larger in external measurements, with a relatively longer and a much more hairy tail. The skulls of the two species, however, are practically of the same size. It can be quite closely matched in pelage and color by specimens of *P. darwini*, but the latter has a longer tail and much weaker dentition. Mr. Waterhouse compared it with his *Phyllotis griseoflavus*, probably its nearest ally, from northern Patagonia (Rio Negro), from which he says it differs in much smaller size, relatively much shorter tail, and in the structure of the molar teeth, as illustrated in plate xxxiv of the "Voyage of the Beagle" (Mammalia).

PHYLLOTIS MICROPUS (Waterhouse).

(Plates XII, Fig. 13, Skull; XIV, Fig. 1, Teeth.)

Mus micropus Waterhouse, P. Z. S., 1837, 17 (Santa Cruz River, Patagonia); Zoöl. Voyage Beagle, Mamm., II, 1839, 61, pl. xx, animal, pl. xxxiv, fig. 13, teeth. Interior plains of Patagonia, in lat. 50°, near the banks of the Santa Cruz.

Hesperomys (*Habrothrix*) *micropus* Burmeister, Descrip. phys. Rép. Argent., III, 1879, 217 (ex Waterhouse).

[*Akodon*] *micropus* Trouessart, Cat. Mamm., ii, 1897, 536 (ex Waterhouse and Burmeister). — Lahille, Congr. Cien. Lat. Amer., III, 1899, 188.

Adult (February). — Above yellowish brown, with a slightly rufescent cast, strongly varied with black-tipped hairs; sides lighter, more yellowish; nose less yellow, dusky gray; below gray, washed more or less with buff or tawny, chiefly on the pectoral and post-pectoral areas; ears large, well haired, similar in color to the median dorsal area; tail rather more than one third of the total length, bicolor, dark brown above, gray or yellowish gray below thinly clothed with short hairs in young specimens, nearly naked in adults; upper surface of the feet yellowish white or nearly flesh-color; palms and soles naked, the former yellowish flesh-color, the latter darker, more brownish.

Young specimens differ little in color from the adults, but the pelage is of a softer, more woolly texture.

Measurements. — Eight adult males measure: Total length, 221 mm. (212-237); tail vertebræ, 92 (85-100); hind foot, 29 (27–30). Ten adult females measure: Total length, 221 (215–235); tail vertebræ, 93 (85–100); hind foot, 29 (28–30). A young adult and an adult skull measure respectively: Total length, 29.5, 32; basal length, 25, 28; zygomatic breadth, 17, 19; mastoid breadth, 8, 9.5; interorbital breadth, 3.8; length of nasals, 7.3, 8; palatal length, 13, 15; palatal foramina, 7, 7.4; diastema, 7, 8; upper molar series, 5.2, 5.3.

Of the fifty specimens of this species about one half are fully adult, the rest being more or less immature, but mainly "young adults." Four were collected by Mr. Colburn — two at Swan Lake in March, and two at Basaltic Cañons in April — and the rest by Mr. Peterson, nearly all during the first half of February (January 31–February 17), and mostly in the Rio Chico valley, close to the river. Two others were taken on the Pacific slope in March.

The coloration of the upper parts is very uniform throughout the series, varying slightly in general tone on the back from yellowish brown to a slight rufescent tinge, the latter seeming to characterize very old specimens. The whitish gray ventral surface varies from a slight tinge of deep buff over a limited portion of the middle region to a much deeper rusty buff, covering a much larger area. Some specimens quite lack the buffy wash.

A portion of the specimens forming the present series was identified by comparison with Waterhouse's type, still extant in the British Museum — a fairly well preserved skin with an imperfect skull. This specimen, according to Darwin's note, was "caught in the interior plains of Patagonia, in latitude 50°, near the banks of the Santa Cruz."

Mr. Peterson states (MSS. notes) that this is the most common species met with on the "Rio Chico Cordillero, especially in the heavy grass near water; but was also caught in timber at some distance from water." It appears to have been rare further north in the more open country where

Mr. Colburn worked, he securing only four specimens during six weeks of constant trapping.

Genus REITHRODON Waterhouse.

Reithrodon Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 29; Zoöl. Voy. Beagle, Mamm., 1839, 68. No type specified.

Reithrodon Coues, Proc. Acad. Nat. Sci. Phila., 1874, 185. Type, *R. cuniculoides* Waterh. — Thomas, Ann.& Mag. Nat. Hist. (7), VIII, Sept. 1901, 254. — Allen, Bull. Am. Mus. Nat. Hist., XIX, May, 1903, 194 (sub *Euneomys*).

Variants or emendations are: *Rithrodon* Agassiz, 1846; *Rheitrodon* Roger, 1887; *Rhithrodon* Flower & Lydekker, 1891.

The genus *Reithrodon*, as originally constituted in 1837, consisted of two species, *R. typicus* and *R. cuniculoides*. Later, other species of American Muridæ with grooved upper incisors were referred to it, including the North American genus now known as *Reithrodontomys*, although these two groups have little in common beyond the superficial character of grooved upper incisors. Other species formerly associated with it are the genera *Euneomys* Coues and *Sigmomys* Thomas, neither of which prove to have more than a superficial likeness to *Reithrodon* as now restricted and as originally constituted.

Two years later, in 1839, Waterhouse himself added to it a third species, *R. chinchilloides*, which, proving not to be congeneric with the others, has since become the type of the genus *Euneomys*.

In 1874, Coues (*l. c.*) divided *Reithrodon* into "*Reithrodon* proper," with *R. cuniculoides* as the type, and *Euneomys*, a new subgenus of *Reithrodon*, with *R. chinchilloides* as the type. In 1901, Thomas (*l. c.*) adopted these two divisions as full genera, and, having previously removed his *Reithrodon alstoni* as the type of a new genus *Sigmomys*,[1] arranged the "South America groove-toothed Muridæ" in three genera, *Reithrodon*, *Euneomys* and *Sigmomys*, which really have little in common. Later a somewhat detailed comparison of *Reithrodon* and *Euneomys* was given by the present writer.[2]

The genus *Reithrodon* is represented by four species and an additional subspecies, and, so far as known to me, is restricted to Patagonia, Argentina and Paraguay. Besides those here included, *R. typicus* Waterh. was described from specimens taken at Maldonaldo, and it has been reported as occurring in southern Paraguay and contiguous portions of Argentina. The other forms are thus far known only from southern Patagonia and Tierra del Fuego.

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[1] Ann. & Mag. Nat. Hist. (7), VIII, Aug., 1901, p. 150.

[2] Bull. Am. Mus. Nat. Hist., XIX, 1903, pp. 194, 195.

REITHRODON CUNICULOIDES Waterhouse.

Reithrodon cuniculoides Waterhouse, P. Z. S., 1837 (Nov. 21, 1837), 30 (Santa Cruz, Patagonia); Zoölogy Voyage Beagle, Mamm., 1839, 69, pl. xxvi, animal, pl. xxxiv, fig. 2, skull and teeth. — Coues, N. Am. Rodent., 1877, 119 (ex Waterhouse). — Burmeister, Descript. phys. Rép. Argent., III, 1879, 230 (ex Waterhouse).— Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zool., Mamm., 1890, 10, pl. ii, animal (Santa Cruz, Patagonia).— Trouessart, Cat. Mamm., ii, 1897, 533. —Thomas, Ann. and Mag. Nat. Hist. (7), VIII, Sept., 1901, 254.

Adult (April). — Above pale fulvous gray strongly varied with black-tipped hairs, the pelage being dark plumbeous for the basal three fourths or four fifths and ending in a band of pale creamy buff, with a profuse intermixture of longer, coarser black-tipped hairs; sides lighter, more yellowish, passing gradually into the nearly uniform ochraceous buff of the ventral surface; inside of the thighs whitish; ears large, well clothed with short hairs, dusky brown externally, deep buff internally, with a tuft of buffy hairs at the anterior base and a postauricular patch of ochraceous buff; upper surface of the feet white or faintly creamy white; palms naked, light flesh-color; soles heavily furred as far as the base of the toes, the furred portion dusky brown, as are the tubercules, but the under surface of the toes flesh-color; tail rather more than one third the total length, thickly haired, yellowish dusky brown above, sides and below whitish.

Measurements. — Eight adults measure: Total length, 225 mm. (215–230, with one 240); tail vertebræ, 86 (80–90, with one 100); hind foot, 34 (33–35). Ten females measure: Total length, 220 (210–235); tail vertebræ, 88 (80–95, with two at 100); hind foot, 33 (32–34).

Adult skulls measure in total length from 33–35 mm., and in zygomatic breadth from 18–19.

Represented by 28 specimens, of which 21 were collected at the Basaltic Cañons in April, and 4 at Swan Lake in March and May, by Mr. Colburn; the other three are from the coast region, two of which were collected near

Santa Cruz, in February, by Mr. Colburn, and the other at the mouth of the Rio Coy, by Mr. Peterson, November 10. This specimen has the ears nearly naked and dark brown on both surfaces, and the general coloration is browner and less olivaceous than in the March, April and May specimens.

Mr. Peterson's manuscript notes indicate that some of the specimens taken were "caught in heavy grass, close to springs of water."

The original specimens described by Waterhouse were taken by Darwin, who says: "Specimens were procured at Port Desire, St. Julian, and Santa Cruz; at this latter place they were caught in numbers (in traps baited with cheese), both near the coast and on the interior plains. A specimen from Santa Cruz weighed 1336 grains. In the early part of January, there were young individuals at Port St. Julian." (Zoöl. Voy. Beagle, Mamm., p. 71.)

Mr. Colburn's localities show that the species ranges in the interior to one hundred and fifty or two hundred miles northwest of St. Julian and Santa Cruz.

REITHRODON CUNICULOIDES OBSCURUS Allen.

Reithrodon cuniculoides obscurus Allen, Bull. Am. Mus. Nat. Hist., XIX, 190, May 9, 1903. Punta Arenas, Patagonia.

Similar to *Reithrodon cuniculoides* but darker throughout, the upper parts dark brown, varied with black-tipped hairs and suffused with fulvous, the sides yellowish, and the ventral surface brownish ochraceous; inner side of thighs and anal region whitish; top of head blackish, slightly varied with buff-tipped hairs; sides of nose and cheeks brownish ochraceous like the ventral surface; ears very thinly haired, brown externally, brownish buff internally, with a deep ochraceous buff postauricular patch; upper surface of feet clear white; tail blackish above along median line, sides and below grayish white.

Measurements (of type, from dry skin). — Total length, 195 mm.; head and body, 130; tail, 65; hind foot, 34. (The tail appears to have lost a small portion of the tip.) Skull (imperfect), length of nasals, 15.5; palatal length 18; palatal foramina, 10; diastema, 9.5; upper molar series, 6.

Unfortunately represented by only the type specimen, which has no flesh measurements. The skull shows the specimen to be fully adult, and larger than any skull in the large series of *R. cuniculoides*. It is characterized by its very strong, dark coloration, between which and the darkest, most-deeply colored specimen in a series of 28 examples from the coast region, near Santa Cruz, there is a striking contrast through the greater depth and intensity of all the tints. Considering the climatic conditions of the two regions — the moist, forested country of the Punta Arenas district and the open, arid plains of the Santa Cruz district — the differences here shown in the coloration of the two phases conform to what would be expected to result from such diverse physical conditions. The differences are certainly not to be accounted for by season or age. It finds an exact parallel in the cases of *Akodon xanthorhinus* as compared with *A. canescens* and *A. michælseni* as compared with *A. macronyx*.

REITHRODON HATCHERI Allen.

(Plate XIV, Figs. 8–8*d*, Skull.)

Reithrodon hatcheri Allen, Bull. Am. Mus. Nat. Hist., XIX, 191, May 9, 1903. Pacific slope of the Cordilleras, upper Rio Chico de Santa Cruz, Patagonia.

Similar in size and proportions to *R. cuniculoides*, but much darker, and with much less fulvous suffusion.

Adult male (type), March. — Above dark grayish brown, varied with black-tipped hairs, faintly suffused with grayish fulvous; sides paler, passing gradually into the pale buff of the ventral surface; sides of nose, lower border of cheeks, lower border of flanks, and whole ventral surface cream-buff, except inside of thighs and adjoining portion of ventral surface; ears rather thinly haired, externally dull brown, internally yellowish buff, the hairs at the anterior base of the ears whitish and the postauricular patch pale buff; upper surface of the feet white; soles of hind feet to base of toes densely haired, dark brown, toes flesh-color; tail with a narrow brown stripe above, sides and below dull whitish.

Measurements. — Type: Total length, 230 mm.; tail vertebræ, 78; hind foot, 34; Seven specimens (4 males and 3 females) measure; Total length, 215 (200–230); tail vertebræ, 77 (75–82); hind foot, 33.3 (32–35).

Skull (type). — Total length, 35.7; basal length, 31; zygomatic breadth, 20.5; interorbital breadth, 4; length of nasals, 16; palatal length, 17.5; palatal foramina, 9; diastema, 8.5; upper molar series, 6.4.

Represented by ten specimens, all collected by Mr. Peterson in the Cordilleras at the head of the Rio Chico de Santa Cruz, and all but one (the type, taken March 11) between February 4 and 21, 1897. Part of the specimens, including the type, are in the dress of the breeding season, while others have partly or wholly acquired the postbreeding dress. These have a stronger suffusion of yellowish buff on the sides and ventral surface, but are otherwise similar to the type. A quarter-grown young example is similar in general coloration to the adults except that the ears have the external surface blackish and the internal surface deep buff, with the hairs at the anterior base of the ears and the postauricular patch also deep buff, in prominent contrast with the surrounding pelage, as is not the case in the adults.

Reithrodon hatcheri is readily distinguishable from *R. cuniculoides* by its much darker and less fulvous coloration, the contrast in color between the two series being conspicuously noticeable. There are apparently no cranial differences of importance.

Genus EUNEOMYS Coues.

Euneomys Coues, Proc. Acad. Nat. Sci. Phila., 1874, 185 (as a subgenus of *Reithrodon*). Type, *Reithrodon chinchilloides* Waterh.—Thomas, Ann. & Mag. Nat. Hist. (7), VIII, Sept., 1901, 254 (as a full genus).—Allen, Bull. Amer. Mus. Nat. Hist., XIX, May, 1903, 194.

The early history of *Euneomys* has already been given under that of *Reithrodon*. The two genera differ so radically in certain cranial characters, especially in the structure of the last two molars, both above and below, that they have no close relationship, and the two are placed together for treatment in the present connection only as a matter of convenience. Their differences were, in part, clearly indicated by the late Dr. Coues, on the basis of Waterhouse's plates of the skulls and teeth of the two species Coues designated respectively as the types of the two groups. These I have already summarized in another connection as follows:

"The most important of these [the differential characters pointed out by Coues] are: (1) 'Anterior root of zygoma deeply emarginate in front' in *Reithrodon* and 'about straight in front' in *Euneomys;* (2) 'palate ending much behind the molar series and showing a median ridge intervening between lateral paired deep excavations' in *Reithrodon*, and 'palate ending nearly opposite the last molars, slightly ridged or excavated' in *Euneomys;* (3) 'pterygoid fossæ deeply excavated, and the bones very closely approximated' in *Reithrodon*, and 'pterygoid fossæ shallow and these bones less approximated' in *Euneomys;* (4) 'condyloid process of lower jaw concave internally' in *Reithrodon*, and 'condyloid process of the lower jaw flat internally' in *Euneomys;* (5) 'coronoid process slender, very oblique' in *Reithrodon*, and 'coronoid process very broad, nearly vertical' in *Euneomys*. To these may be added (6) the very different enamel pattern of the molar teeth in the two groups, in *Reithrodon* the folds being transverse with the outer and inner loops alternating, and in *Euneomys* oblique, with one less fold in each of the last two upper teeth, and in the first two lower teeth—a very radical difference in tooth structure, which alone warrants the generic separation of the two groups. As Waterhouse figured the crown surface of the teeth in only *R. cuniculoides*, this most important difference of all necessarily escaped Coues's attention.

"In both these genera—*Reithrodon* and *Euneomys*—the tooth structure is remarkably distinctive for genera of Muridæ, and, as compared with each other, presents almost the extremes of unlikeness. But a further noteworthy difference (7) is seen in a pair of depressions on the posterior third of the palatal surface in *Euneomys*, which are absent in *Reithrodon* and in all the allied genera."

The only species I can confidently refer to *Euneomys* are the two described below, namely *E. chinchilloides* (Waterh.), from Tierra del Fuego, and *E. petersoni*, from the upper Rio Chico, in the foothills of the Cordilleras, Patagonia.

Phyllotis boliviensis and *P. pictus*, which have been referred to *Euneomys*, appear to be merely somewhat aberrant forms of *Phyllotis*.

EUNEOMYS CHINCHILLOIDES (Waterhouse).

Reithrodon chinchilloides Waterhouse, Zoöl. Voyage Beagle, II, Mammalia, 1839, 72, pl. xxvii, animal, pl. xxxiv, fig. 20, skull and teeth. "South shore of the Strait of Magellan, near the eastern entrance."—Burmeister, Descrip. phys. Rép. Argent., III, 1879, 217 (ex Waterhouse).—Milne-Edwards, Mission Scient. du Cap Horn, VI, Zool., Mamm., 1890, 29, pl. iii, animal. Orange Bay, southern Tierra del Fuego.

Reithrodon (*Euneomys*) *chinchilloides* Coues, Proc. Acad. Nat. Sci. Phila., 1874, 185, footnote; Nat. Hist. No. 1, Muridæ, 1874, 17; N. Am. Roden., 1877, 119.

As this species is unrepresented in the present collection, the description here given is transcribed from Waterhouse.

"*Description.*—Ears small; tail shorter than the body; tarsus moderate; fur long and extremely soft. General hue of the upper parts of the head and body ashy brown; lower part of the cheeks and sides of the body are of a delicate yellow colour; the under parts of the head and body and the rump are cream colour. The ears are blackish; the tail is tolerably well clothed with longish hairs, which are, however, not so thickly set as to hide the scales—on the upper side they are blackish brown; on the sides and beneath they are white. The feet are white. All the fur is of a deep gray colour at the base; the hairs of the back are of a very pale yellow colour (almost white) near the tip, and brown at the tip; the longer hairs are black at the apex. The incisors are yellow; the hairs of the moustaches are numerous and very long—some of them are whitish, and others are black at the root, and gray at the apex.

	Inches.	Lines.	[mm.]
"Length from nose to root of tail	5	0	127
" of tail	2	4	59
" from nose to ear	1	2	25.8
" of tarsus (claws included)	1	0	25.4
" of ear	0	5½	12.6

"Habitat, South shore of the Strait of Magellan, near the Eastern entrance."—Waterhouse, *l. c.*

Milne-Edwards (*l. c.*) states that it was obtained at Orange Bay, where, however, only two examples were secured during a long sojourn there by the French Mission. Little therefore appears to be known regarding its distribution or habits.

EUNEOMYS PETERSONI Allen.

(Plates XIII, Fig. 4, Skull; XIV, Figs. 6 and 7, Teeth.)

Euneomys petersoni Allen, Bull. Am. Mus. Nat. Hist., XIX, 192, May 9, 1903. Near Cordilleras, upper Rio Chico de Santa Cruz, Patagonia.

Similar in coloration to *Phyllotis xanthopygus*, but very much smaller, with a relatively very short tail and naked soles, but the upper incisors as strongly grooved as in *Reithrodon cuniculoides*.

Adult (type), February.—Pelage very long and soft, almost woolly. Above dark gray-brown, varied with blackish and fulvous, the pelage being plumbeous black for the basal four fifths with an apical band of brownish fulvous, and many longer black hairs intermixed; sides much paler and more fulvous, the fulvous increasing in intensity along the lower border; ventral surface soiled white, the fur being basally very dark plumbeous and broadly tipped with yellowish white; ears dark brown on both surfaces and very thinly haired, the surrounding fur concolorous with that of the anterior dorsal surface; sides of nose and lower border of cheeks whitish gray with a faint tinge of yellowish; soles naked except the posterior third, dark flesh-color; upper surface of fore and hind feet pale flesh-color, nearly white; tail one third or less than one third of the total length, well clothed, dusky brown above, sides and below white.

Measurements.—Total length, 175 mm.; tail vertebræ, 60; hind foot, 26. Three other specimens (young adults) measure: Total length, 160 (150–165); tail vertebræ, 57 (50–60); hind foot, 25 (25–25).

Skull.—Long and narrow, the interorbital and rostral portions especially elongated; postpalatal fossa narrow and V-shaped, but not quite so narrow and pointed in front as in *Reithrodon cuniculoides;* front border of zygomatic plate as in *Phyllotis*, *Oryzomys*, etc., lacking the pointed superior process seen in *Reithrodon* and *Sigmodon;* bullæ small and pointed, as in *Phyllotis;* upper incisors deeply grooved; molars brachyodont as in *Phyllotis;* but very broad and heavy—not hypsodont as in true *Reithrodon;* lower jaw short and heavy, to support the thickened molars; posterior end of lower incisors encapsuled, forming a prominent process on the outer sides at the base of the condyloid process. Dimensions (type): Total length, 30.5; basal length, 26.5; zygomatic breadth, 17.5; interorbital breadth, 3.5, width of braincase, 14; length of nasals, 14; palatal length, 14.5; palatal foramina, 8; diastema, 8.5; upper molar series, 5.2; width of molar^1, 1.8; lower jaw, length (inner base of incisors to posterior border of condyle), 18; height at condyle, 15; lower molar series, 5.5.

Represented by four specimens, an adult female that had suckled young, and three younger specimens, nearly adult, all taken by Mr. Peterson, in the Cordilleras at the head of Rio Chico de Santa Cruz, Feb. 8–14, 1897. These specimens are all quite similar in coloration, except that the younger ones are grayer than the adults with much less fulvous suffusion, and with very little fulvous on the flanks and ventral surface.

This species finds its nearest ally in *Euneomys chinchilloides* (Waterhouse), known thus far only from Tierra del Fuego, which it apparently closely resembles in size and coloration.

Genus AKODON Meyen.

Akodon Meyen, Nov. Act. Acad. Cæs. Leop.-Carol., XVI, 1833, 599. Type, *Akodon boliviense* Meyen, sp. nov.

Acodon Tschudi, Fauna Peruana, Mamm., 1844, 177. Emendation of *Akodon.*—Thomas, Ann. & Mag. Nat. Hist. (6), XIV, Nov., 1894, 360. "Syn. *Habrothrix*, Waterh. 1837."

Abrothrix Waterhouse, P. Z. S., 1837, 21 (subgenus of *Mus*). Type, *Mus* (*Abrothrix*) *longipilis* Waterh., sp. nov.—Gray, Cat. Mam. Br. Mus., 1843, 114 (full genus).—Thomas, P. Z. S., 1884, 450 (subgenus of *Hesperomys*); P. Z. S., 1896, 1020 (full genus).

Chelemys Thomas, Ann. & Mag. Nat. Hist. (7), XII, Aug., 1903, 242 (subgenus of *Akodon*). Type, *Hesperomys megalonyx* Waterhouse.

The genus *Akodon*, as currently limited, includes nearly one hundred species, covering quite a diversity of forms, which differ in size, texture of pelage, coloration, and proportion of parts, and it will doubtless be found advisable to divide the group, when better known, into a number of subgenera, although in cranial and dental characters there is great uniformity of structure, and no very evident lines of division. In general they are heavy-bodied, short-limbed, short-tailed, vole-like mice, with ears small to medium, pelage generally soft and full but sometimes short and velvety, and claws of ordinary size or strongly developed and fossorial. The color above varies from mouse-gray to dark brown, with or without reddish brown on the back, or nearly uniform dark yellowish brown; the ventral surface varies from white or whitish gray to dark gray, or, as in the *A. caliginosus* group, to nearly as dark as the color of the back. In the *A. pulcherrimus* group there is a distinct pattern of white markings on the sides of the head, nearly enclosing the ears. The species vary in size from the size of a house mouse to that of the larger species of *Microtus*. The teeth vary little in structure, but very much, relatively, in size, some of the fossorial forms, like *A. macronyx*, having much heavier dental armature, relative to the size of the animal, than the *A. xanthorhinus* group.

Sufficient material is not at present available for a critical revision of the group, which evidently may be divided for convenience into several fairly well-marked sections, characterized mainly by external characters. Mr. Thomas has already separated the big-clawed Akodonts as a subgenus, *Chelemys*, with *A. megalonyx* (Waterhouse) as the type, to include *A. macronyx* and *A. vestitus* Thomas. Another natural group, of at least subgeneric value, consists of *A. caliginosus* (Tomes), *A. urichi* All. & Chapm., *A. irazu* and *A. venezuelensis* Allen, *A. teguina* (Alston), etc.; *A. pulcherrimus*, with its large ears and striking color-pattern, is possibly also separable from such forms as *A. canescens*, *A. xanthorhinus* and their allies.

For the purpose of convenient comparison, figures are given of the skull and dentition of several of the leading types of *Akodon* on plates XI and XII of this work, namely, *A. xanthorhinus, A. canescens, A. caliginosus, A. pulcherrimus, A. suffusus*, and *A. vestitus*.

The genus *Akodon* has a wide geographical distribution, being represented from Costa Rica southward to the Straits of Magellan, and is especially prolific in specific and subspecific forms throughout the Andean region. It is represented in the collections made in Southern Patagonia by the Princeton University Patagonia Expeditions by five species, four of which — *A. xanthorhinus, A. canescens, A. suffusus* and *A. vestitus* — are each represented by large series of specimens, while the fifth, *A. michælseni*, by a single excellent skin, without, however, the skull.

Besides these Philippi described in 1900 a *Mus pachycephalus*, which appears to be an *Akodon*, with the statement "Habitat in Freto Magellanico"; but the description is not satisfactory, and the species is not here formally included.

AKODON XANTHORHINUS (Waterhouse).

Mus xanthorhinus Waterhouse, P. Z. S., Nov. 21, 1837, 17; Zoöl. Voyage Beagle, Mamm., 1839, 53, pl. xvii, fig. 1 (animal). "Hardy Peninsula, Tierra del Fuego (February)."

Hesperomys (Habrothrix) xanthorhinus Thomas, P. Z. S., 1881, 5, part; the Sandy Point specimen only.

Adult (January). — Above dull yellowish brown, closely resembling July specimens of *A. canescens;* underparts whitish gray; nose, feet, and tail also similar to these parts in *canescens* — pale rusty fulvous.

Measurements. — Adult male, Punta Arenas, Chili, Jan. 1, 1898: Total length, 151 mm.; tail vertebræ, 62; hind foot, 20. Skull (4 adults), total length, 25 (24.6–25.3); greatest width of brain case, 11.35 (11–11.6).

This species is represented by 10 specimens collected by Mr. Colburn, about January 1, 1898, at Punta Arenas, of which 7 are adult and 3 immature. Only one of the adults has measurements or is marked for sex. The species is entirely unrepresented in the large series (about 100 specimens) of Akodonts collected by Colburn and Peterson in the Santa Cruz region of Patagonia, and I very much doubt whether it is found there.

These specimens are all in thin summer pelage, and are thus comparable with the gray phase of *A. canescens*, which is the corresponding seasonal pelage of that species. They are thus readily distinguishable in coloration when specimens of corresponding seasons are compared, but summer specimens of *A. xanthorhinus* have a general resemblance in coloration to winter specimens of *A. canescens*. But *A. xanthorhinus* is much the larger animal, although the proportions are similar. The skull, however, is not only larger (averaging about 3 mm. longer), but has the rostral portion of the skull relatively much more attenuated, it being more than one half of the basal length of the skull instead of less than one half, as in *A. canescens*. These specimens agree with Waterhouse's description and type, and there can be no question of their correct identification.

In the original description of *A. xanthorhinus* (*l. c.*) the type locality is given as "Santa Cruz," but in the "Voyage of the Beagle" (*l. c.*) it is given as "Hardy Peninsula, Tierra del Fuego," where also Darwin states: "This species was caught on the mountains, thickly covered with peat, of Hardy Peninsula, which forms the extreme southern point of Tierra del Fuego." This seems to settle the case beyond question that Hardy Peninsula and not Santa Cruz is the type locality of *A. xanthorhinus*. Mr. Waterhouse further says (*l. c.*, p. 55): "The specimens of this animal [*M. xanthorhinus*] are both from Patagonia; one of the specimens of *Mus xanthorhinus* was brought by Mr. Darwin from Tierra del Fuego; and as the other formed part of Captain King's collection, it in all probability came from the same locality."

Waterhouse had, curiously, an old and young specimen each of *Mus xanthorhinus* and *M. canescens;* of the former one specimen is still extant in the British Museum, but the other seems to have been lost, although, as noted below (p. 73), both specimens of *M. canescens* still remain. The specimen of *M. xanthorhinus* is B. M. No. 55–12–24–156, and is labelled "Hardy Peninsula, Ex. Coll. C. Darwin," and should of course stand as the type.

Mr. Waterhouse seems to have been in doubt as to whether *M. xanthorhinus* and *M. canescens* were really distinct species. He says in the "Voyage of the Beagle" (*l. c.*, p. 54): "It was with some hesitation that I described this [*M. canescens*] as a distinct species in the Society's Proceedings. I have now re-examined the specimens, and still am unable to satisfy myself whether they are varieties of *Mus xanthorhinus* or not. Both of *Mus canescens* and of *Mus xanthorhinus*, I have before me what I imagine to be an adult and a young specimen. The adult and the young of *M. xanthorhinus* agree in being of a *yellowish-brown* colour, and in having the muzzle and tarsi deep yellow; both specimens of *Mus canescens* are of a gray colour, with an indistinct yellow wash, the muzzle and tarsi being tinted with yellow, as in *M. xanthorhinus*." These are just the differences, as shown by the present material, that distinguish the two species, as regards coloration. But there is considerable difference in size, *xanthorhinus* being the larger, especially as shown by the skull, as already stated, which also differs markedly in form in the two species.

In examining the types of these species in the British Museum, in July, 1901, I found that they had been misassigned, the two specimens of Waterhouse's *Mus canescens* having been identified, respectively, as the types of *M. canescens* and *M. xanthorhinus*, the Port Desire specimens being designated as the type of *M. canescens*, and the Santa Cruz specimen as the type of *M. xanthorhinus*, while the Hardy Peninsula specimen, the real type of *M. xanthorhinus* was not designated as a type. This probably explains the record made, on the authority of Mr. Thomas, in Milne-Edward's report on the mammals collected by the Mission Scientifique du Cap Horn (Mammals, p. 28), of specimens of *Akodon xanthorhinus* from Santa Cruz, Patagonia, which record is only intelligible on the basis of the above explained misidentification of Waterhouse's type.

Akodon canescens (Waterhouse).

Mus canescens Waterhouse, P. Z. S., Nov. 21, 1837, 17; Zoöl. Voyage Beagle, Mamm., 1839, 54. Port Desire.

Hesperomys (*Calomys*) *canescens* Burmeister, Descrip. phys. Rép. Argentine, III, 1879, 227 (ex Waterhouse).

Hesperomys (*Habrothrix*) *xanthorhinus* Thomas, in Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zoologie, Mamm., 1890, p. 28, pl. vi, fig. 1, animal. Santa Cruz de Patagonie.

Akodon canescens Thomas, P. Z. S., 1898, 211, Chubut, E. Patagonia.

Adult (March and April). — General color above gray, faintly suffused with fulvous and varied slightly with black-tipped hairs; below whitish gray, the basal portion of the fur plumbeous, the tips whitish; sides and front of nose pale rusty fulvous; ears rusty brown; upper surface of fore and hind feet yellowish white or pale rusty fulvous; tail rather indistinctly bicolor, darker above and lighter below, with usually a faint rusty tinge throughout. The ventral surface and sides are often faintly washed with pale fulvous.

Half grown young are almost indistinguishable in coloration from the adults.

Adult (July). — Pelage longer and fuller, and general coloration above yellowish gray-brown, the general tone darker and browner than in April specimens; under parts whiter and with rarely any tinge of buff; sides of nose more rusty, and upper surface of feet more buffy. The difference between the gray summer pelage and the darker and more fulvous brown winter pelage is quite strongly shown in March, April and July specimens from practically the same locality.

The two series from the Rio Coy, consisting of five specimens taken in November and others taken the last of August, well show the two pelages, and indicate that the gray pelage is worn from about November till May, and the brown pelage from about June to September as is further shown by specimens from the vicinity of Cape Fairweather.

Measurements. — Many of the specimens are more or less immature. Throwing out these, save possibly a few young adults, the series, collected and measured by Mr. Colburn, gives the following: 16 males, total length, 132 mm. (125–140, with one reaching 150); tail vertebræ, 50.9 (50–55); hind foot, 19.7 (19–20): 16 females, total length, 135.3 (125–145); tail vertebræ, 50 (45–55); hind foot, 20 (19–20). Fully adult specimens appear to rarely fall below 130 mm. in total length, and very few exceed 140 mm.

Seven males and four females collected and measured by Mr. Peterson, from the upper Rio Chico de Santa Cruz, give similar results, as follows: 7 males, total length, 136 (125–151); tail vertebræ, 50 (46–54), hind foot, 20 (18–21): 4 females, total length, 137 (126–148); tail vertebræ, 50.7 (45–55); hind foot, 20 (20–20).

Thirteen specimens from Cape Fairweather, all males, collected and measured by Mr. Peterson, give the following: Total length, 125.4 (120–135); tail vertebræ, 45.6 (42–51); hind foot, 20.4 (20–21). Eight specimens from Coy Inlet, collected and measured by Mr. Peterson, all males but one: Total length, 138.5 (130–144); tail vertebræ, 52 (43–60); hind foot, 20 (19–20).

The principal measurements of 4 adult skulls are: Total length, 22.9 (22.3–24); greatest width of brain case, 10.8 (10.7–11).

Represented by 95 specimens, collected partly in the coast region and partly on the upper Rio Chico and the plains southeast of Lake Buenos Aires. The coast specimens comprise 4 taken near Mount Observation, February 21, by Mr. Colburn, and 35 from points further southward, taken by Mr. Peterson, as follows: Rio Gallegos, 2 specimens, May 23; Halliday Ranch, mouth of the Rio Gallegos, 3 specimens, June 24; Cape Fairweather, 13 specimens (all males), July 5–13; Rudd Ranch, near Cape Fairweather, 8 specimens, July 27 and 28; Coy Inlet, 9 specimens, August 8 and 31, September 1, and November 7–11. The specimens from the interior include 14 specimens collected on the upper Rio Chico, by Mr. Peterson, January 31 (7 specimens), February 3–6 (5 specimens), and March 26 (2 specimens); and 34 collected by Mr. Colburn at Basalt Cañons, April 8–28, and 5 at Swan Lake (March 18–20 and May 4 and 15).

The summer and fall specimens from the interior are darker and grayer and much less fulvous than the winter specimens from the coast, but there are enough specimens collected at intermediate dates to show that the difference is, almost beyond question, seasonal and not geographical.

The species thus seems to range across southern Patagonia from Cape Fairweather to the Cordilleras. It was not, however, obtained by Mr. Colburn at Punta Arenas, where he collected only *A. xanthorhinus*.

The two specimens on which the species was originally based by Waterhouse were collected by Darwin, one at Port Desire and the other at Santa Cruz. Only Port Desire is mentioned in the original description, but in the Voyage of the "Beagle" (Mamm., *l. c.*) the "habitat" is given as "Santa Cruz and Port Desire (December)." Both these specimens are still preserved in the British Museum and have been compared with a large number of specimens from the present series. These types are Nos. "55–12–24–157. Loc. Santa Cruz, Ex Coll. C. Darwin," and "55–12–24–143. Loc. Port Desire, Ex Coll. Ch. Darwin," marked as the type of *A.*

canescens. The other is mistakably identified as the type of *A. xanthorhinus*, as already noted under that species.

Akodon canescens is closely related to *A. arenicola* (Waterhouse), based on specimens from Maldonaldo, at the mouth of the La Plata, but it differs from it in smaller size, more grayish coloration, and yellowish muzzle. Two specimens collected by Mr. Durnford at Chubut are referred by Mr. Thomas (*l. c.*) to this species. Mr. Durnford, in his field notes published by Mr. Thomas, says it is "common in straw-heaps and granaries," and that it "burrows in the ground, or more usually takes possession of some of the numerous cracks which may always be found in the earth, and appropriates them for its home. It has five or six young at a birth."

AKODON SUFFUSUS Thomas.

(Plates XI, Fig. 5, Skull; XII, Figs. 9 and 10, Teeth.)

? Hesperomys (*Habrothrix*) *longipilis* Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zoöl., Mamm., 1890, 28, pl. v, fig. 2, animal. "Santa Cruz de Patagonie."

Acodon suffusus Thomas, Ann. and Mag. Nat. Hist. (7), XII, Aug., 1903, 241. "Valle del Lago Blanco, Southern Chubut (Cordillera region)."

Median upper surface, from between the eyes to base of tail, dark dull reddish brown; sides of head and body gray, passing gradually into the reddish brown of the back and into the grayish white of the ventral surface, which extends unusually high up on the sides of the body and cheeks; ventral surface white or grayish white, the pelage plumbeous at the base, in some specimens wholly concealed by the long white tips of the hairs; facial region anterior to the eyes gray like the sides of the body with a faint tinge of brown; ears covered with very short brownish hairs externally, nearly naked internally; tail bicolor, reddish brown above, whitish below, heavily clothed with short hairs; fore feet dingy soiled yellowish gray above, palms naked, flesh color; hind feet soiled whitish, soles naked, dusky brown.

Measurements.—Average and extreme measurements of 13 males: Total length, 170 mm. (165–178); tail vertebræ, 70 (65–74); hind foot, 25 (25–26). The females are slightly larger, 8 females measuring as follows: Total length, 176.6 (170–188); tail vertebræ, 71.8; hind foot, 25.

An average adult skull measures as follows: Total length, 30; basal length, 25; length of nasals, 11; palatal length, 12; palatal foramina, 6.3; diastema, 7.2; upper molars, 4; greatest breadth, 13; interorbital breadth, 5.

This species is represented by 35 specimens, five of which are from the Rio Coy, and the rest, except two from the upper Rio Chico, near or within the Cordilleras, two being from the Pacific slope of the Cordilleras; all were collected by Mr. Peterson. The Rio Coy specimens were taken in November, the Rio Chico specimens at various dates from January 31 to March 4. Two additional specimens were taken by Mr. Colburn, one at Swan Lake, March 14, and the other at the Basalt Cañons, April 30. The several half grown young in the series are similar in coloration to the adults, except that the brown of the upper parts is rather duller. The adults are very uniform in coloration.

In Patagonia this species ranges, as shown by the present material, from the coast region westward into the eastern base of the Andes, and probably thence northward. Mr. Peterson refers to it as one of the most common species of the upper Rio Chico region, frequenting the edge of the timber as well as the more open grassy country. He states that the "skin always adheres to the tail very firmly in adults," and most of the specimens show that the skin of the tail was split open to remove it and afterwards sewed up.

Before the present material came into my hands a number of specimens of this species were sent to Mr. Oldfield Thomas for determination, and he identified them as his *Akodon hirtus*. When at the British Museum in 1901, I made direct comparison of a number of specimens with the type and paratype of *A. hirtus*. In writing up the history of this species in 1902, under the name *Akodon hirtus*, I made the following comment on the case:

"*Akodon hirtus* was based on two specimens collected at San Rafael, Mendoza, by Mr. Bridges many years ago, the type and paratype having been skinned from alcoholic specimens. The skins cannot, therefore, be trusted as regards color; they agree, however, as closely with the upper Rio Chico specimens as could be expected, and the skulls present no appreciable differences. It should be noted, however, that the type locality of the species is about 1,000 miles directly north of the upper Rio Chico region, and it seems more than probable that comparison of a good series of freshly collected skins from the two localities would reveal appreciable differences. The tabulation of the measurements (summarized above) for use in the present connection shows that the dimensions given by Mr.

Thomas for his type of *A. hirtus* are much larger (total length 197) than the very largest of a series of over 20 adults from the Rio Chico country. The measurements of the type skull, however, do not exceed those of average adults from the Rio Chico. For the present I follow Mr. Thomas in identifying the Rio Chico specimens, quite a number of which have passed through his hands, with *A. hirtus*."

Since the above was written, however, Mr. Thomas has described an *Akodon suffusus* from a point quite near the Rio Chico region and in quite similar country, and, in the absence of authentic specimens of *A. suffusus* for comparison, it seems quite beyond question that the present series should be referred to *A. suffusus* rather than to *A. hirtus*, described from a point so much further north and from a markedly different region.

Mr. Thomas, in describing *A. suffusus*, says: "Closely allied to *A. hirtus*, Thos., but the general colour stronger, the belly lighter, and with certain cranial differences detailed below." These are: "Skull in general shape like that of *A. hirtus*, not elongated as in *A. longipilis*. But it is rather lower and flatter throughout, less rounded and convex along the middle line, especially in the interorbital region."

I am also indebted to Mr. Thomas for the suggestion, made some time ago, that *Hesperomys* (*Habrothrix*) *longipilis* of Milne-Edwards, as cited above, is probably his *Akodon hirtus* of later date — now *A. suffusus*.

Subgenus CHELEMYS Thomas.

Chelemys Thomas, Ann. & Mag. Nat. Hist. (7), XII, Aug., 1903, 242. Type, *Hesperomys megalonyx* Waterhouse.

"General characters, skull, and dentition as in *Akodon*, but the claws, especially the anterior ones, very large, fossorial. . . .

"Now that the known species have been so considerably multiplied, it seems convenient to have a subgeneric name by which to designate what have hitherto been termed the 'long-clawed Akodons.'" — Thomas, *l. c.*

Mr. Thomas formally refers to this subgenus three species, *Akodon megalonyx* (the type), *A. macronyx*, and *A. vestitus*.

AKODON (CHELEMYS) VESTITUS Thomas.

(Plates XI, Fig. 5, Skull; XII, Figs. 9 and 10, Teeth.)

Akodon (*Chelemys*) *vestitus* Thomas, Ann. & Mag. Hist. (7), XII, Aug., 1903, 242, "Valle del Lago, Cordillera region of Southern Chubut Territory, Patagonia."

Adult (February).—Pelage full, soft and long. Above nearly uniform hair brown with a slight yellowish suffusion; sides of head and body and under parts whitish gray, the plumbeous underfur nearly concealed by the long white tips of the hairs; ears small, thickly clothed with short hairs of the color of the dorsal surface; tail short, well clothed, bicolor, brown above and whitish gray below; upper surface of fore and hind feet soiled whitish with a faint tinge of flesh-color, palms and soles naked, the former yellowish flesh-color, the latter similar but slightly darker.

Measurements.—Four adult males measure: Total length, 174 mm.; tail vertebræ, 52; hind foot, 25.5. Three adult females measure: Total length, 174 (168–180); tail vertebræ, 47 (45–50); hind foot, 25.3 (25–26). The longest fore claws have a length of 6 to 7 mm., the longest hind claws measure 4 to 5 mm.

Skull (adult female): Total length, 30; basal length, 26; greatest breadth, 14; interorbital breadth, 5; length of nasals, 12; palatal length, 13; diastema, 8; palatal foramina, 7; upper molars, 5.

This species is represented by 9 specimens taken on the upper Rio Chico, near the Cordilleras, in February, 1897, by Mr. O. A. Peterson. They are all adult and very uniform in coloration, but vary a little in general tone, from yellowish brown to reddish brown.

Its nearest known relative is the *A. macronyx* Thomas, decribed from the "east side of the Andes, near Fort San Rafael, Province of Mendoza," with which Mr. Thomas thus compares it: "General appearance and proportions very much as in *A.* (*C.*) *macronyx* Thos., but colour darker, tail more distinctly bicolor, and skull broader and flatter." He says further: "This species is the southern representative of *A. macronyx* Thos., to which it is no doubt very nearly allied; but the fresh series now available indicates that it should have a name of its own."

Specimens from the Rio Chico, Cordilleras, Patagonia, were sent some years ago by Dr. Merriam to Mr. Thomas for identification, and were labelled by him as "*Akodon macronyx*, Thos." With these specimens before me, I accepted this identification in preparing my account of this species, written two years ago, but added: "The type locality of this species [*A. macronyx*] is near Mendoza, nearly a thousand miles to the northward, and in all probability the southern form here described will prove separable from true *A. macronyx*, at least as a subspecies, on comparison with a good series of Mendoza specimens." Being without material for comparison, however, it did not seem desirable to make the separation suggested, and which Mr. Thomas has since made.

AKODON (CHELEMYS) MICHAELSENI (Matschie).

Hesperomys (*Acodon*) *michaelseni* Matschie, Hamburger Magalhaensische Sammelreise, Säug., 1898, 5, pl. figs. 1, 1 *a–h*, animal, ear, hand and foot, and skull. "Süd. Patagonien, Punta Arenas."—Thomas, Ann. & Mag. Nat. Hist. (7), XII, Aug., 1903, 343 (in text, suggesting it is probably a *Notiomys*).

Adult (January).—Pelage short, thick, soft. Above uniform dusky brown; ventral surface similar but lighter with a slightly grayish instead of brownish hue. Ears short, wholly concealed in the fur; upper surface of fore feet rusty brown; of hind feet dull brown, with a slightly rusty tone. Claws of fore feet very long, as in *A. megalonyx*.

Measurements.—Total length, 142 mm.; head and body, 97; tail, 45; hind foot (without claws), 19; ear, 11. Skull, total length, 27.6; basal length, 24; greatest breadth, 13.4; interorbital breadth, 4.8; length of nasals, 12; palatal length, 11; diastema, 7; palatal foramina, 5.6: upper molar series 3.5. (Measurements from Dr. Matschie, *l. c.*)

Represented by a single specimen, without skull or measurements, of apparently an adult male, taken Jan. 1, 1898, by Mr. Colburn at Punta Arenas, the type locality of the species. In size, proportions, and texture of pelage it closely resembles *Akodon megalonyx*, but differs in its very much darker coloration, both above and below.

Its identity with Dr. Matschie's *Akodon michaelseni*, described and figured from a single female specimen, also taken at Punta Arenas, is almost beyond question, as is also its distinctness from *A. megalonyx*. The species is apparently thus far known only from the specimens here mentioned. It is here referred to the subgenus *Chelemys* with some hesitation. Mr. Thomas (*l. c.*) has recently suggested that it may be referable to *Notiomys*.

Genus NOTIOMYS Thomas.

Notiomys Thomas, in Milne-Edwards, Miss. Scient. du Cap. Horn, VI, Zool., Mamm., 1890, 24. Subgenus of *Hesperomys*. Type, *Hesperomys* (*Notiomys*) *edwardsii* Thomas, sp. nov.—Thomas, P. Z. S., 1896, 1020 (full genus).

The genus *Notiomys* appears to have been based mainly on the character of the feet, notably the presence of strongly developed claws on the fore feet, and the small size of the ears. In remarking upon its affinities Mr. Thomas says:

"Le *Notiomys* offre dans son organisation une combinaison de caractères empruntés à divers sous-genres d'*Hesperomys*. Ainsi, par son aspect extérieur il ressemble aux *Calomys*, par ses griffes allongées aux *Onychomys*, par la griffe dont le pouce est pourvu aux *Scapteromys* et aux *Oxymycterus*. D'autre part, par la structure de son crâne et de ses dents, il se rapproche des *Habrothrix* dont on doit le considérer comme très voisin, malgré les différences extérieures que l'on constate. La nécessité d'établir pour cet animal une distinction subgénérique ne peut être mise en doute et peut-être même, quand on aura pu étudier des exemplaires conservés dans l'esprit-de-vin, reconnaitra-t-on la nécessité de le placer au rang de genre distinct."

Notiomys is more closely related to *Akodon* than to any other genus, it closely approaching the subgenus *Chelemys*, and presenting only a superficial resemblance to either *Oxymycterus* or *Scapteromys*, judging by the description and figures of the only known specimen of *Notiomys*. The skull is rather broad and short, with a broad rostrum, broad and short palatal foramina, and not very heavy dentition, judging by Milne-Edwards's figures (*l. c.*, pl. viii, figs. 1–1*d*), — features quite unlike those found in the smaller species of *Oxymycterus*. The palatal foramina end considerably in front of the first molars, instead of extending posteriorly to about the middle or posterior third of these teeth, as in most species of *Akodon* and *Oxymycterus*, and more resembling the condition commonly seen in *Oryzomys*. The principal characters of *Notiomys* would therefore seem to be the long fore claws, small ears, and short, broad palatine foramina, combined with the usual cranial and dental characters of *Akodon*.

NOTIOMYS EDWARDSII (Thomas).

Hesperomys (*Notiomys*) *edwardsii* Thomas, in Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zoologie, Mamm., 1890, 24, pl. iii, fig. 1, animal, pl. viii, fig. 1, skull. "Patagonie, au sud de Santa Cruz, vers le 50^e degré de latitude Sud."

Notiomys edwardsii Trouessart, Cat. Mamm., ii, 1897, 540, ex Thomas, as above.

Similar in size and general appearance to *Eligmodontia lepida* (Thomas), but easily distinguished by the much larger claws on the fore feet. Above grayish fawn color, below white; tail short, covered with short close hairs, concealing the annulations, pale fawn above and white below. Front feet armed with long, fossorial claws, similar to those of *Akodon* (*Chelemys*) *macronyx;* claws of hind feet rather long; soles naked, flesh-color; ears small.

Measurements.—Total length, 115 mm.; head and body, 80; tail vertebræ, 35. Skull, total length, 20; greatest breadth, 13; length of nasals, 9.7; palatal length, 11; diastema, 6.1; upper molar series, 3.2. Description abridged from Thomas (*l. c.*).

This small species appears to be still known only from the unique type, collected by Mr. Lebrun, a little southward of Santa Cruz (lat. 50° S.), Patagonia. It is not included in the very large series of Muridæ collected near the type locality by the Princeton Expeditions, and it is therefore probably not numerously represented.

Genus OXYMYCTERUS Waterhouse.

Oxymycterus Waterhouse, P. Z. S., 1837, 21. Subgenus of *Mus*. Type, *Mus* (*Oxymycterus*) *nasutus* Waterhouse.—Tomes, P. Z. S., 1861, 285 (full genus).—Thomas, P. Z. S., 1884, 450 (subgenus of *Hesperomys*); P. Z. S., 1896, 308 (full genus).

The chief characters of *Oxymycterus* are the long narrow rostrum, relatively narrow interorbital region with evenly rounded supraorbital edges, the maxillary branch of the zygoma narrow with its antero-superior border rounded, fossorial claws, and small ears. There is nothing very characteristic in the structure of the molars to distinguish it from *Akodon* and allied genera.

The group contains at present some 15 to 20 species, ranging from the Andean region eastward and southward over southern Brazil to Patagonia. They vary greatly in size, and somewhat in other features. Thus *O. lanosus* is but little larger than a house mouse, while *O. inca*, *O. juliacæ* and *O. apicalis* are as large as a half-grown house rat, with other species intermediate in size. The whole dentition, incisors as well as molars, is weak in all, but in the smaller species is apparently even more reduced than in the larger forms, but the maxillary branch of the zygoma is relatively broader and less rounded on the upper anterior border than in the larger forms. *O. apicalis* is an aberrant member of the group, as regards its external characters, having non-fossorial claws and peculiar pelage.

The present collection includes two species referable to *Oxymycterus*, namely, *O. lanosus* Thomas and *O. microtis* Allen. They are both small forms, with fossorial claws and small ears, with the teeth and general form of the skull of the larger species of *Oxymycterus*, but with very small teeth and a relatively wider and less rounded zygomatic plate. The single skull of *O. lanosus* (the specimen was identified by Mr. Oldfield Thomas) has no trace of an interparietal, which would thus seem to ally it with *Blarinomys*.

In the accompanying plates (Pl. IX, Figs. 3–6, Pl. X, Figs. 6–10), the skull and dentition is presented, for convenience of comparison, of five species of *Oxymycterus*, including such diverse forms, as *O. lanosus*, *O. microtis*, *O. inca*, *O. juliacæ* and *O. apicalis*.

OXYMYCTERUS LANOSUS Thomas.

Hesperomys (*Habrothorix*) *xanthorhinus* Thomas, P. Z. S., 1881, 5, part; only the specimen from Monteith Bay.

Oxymycterus lanosus Thomas, Ann. & Mag. Nat. Hist. (6), XX, Aug., 1897, 218. Monteith Bay, Straits of Magellan.

Adult (February).—With a striking similarity to *Akodon xanthorhinus* in size, proportions and coloration, but with much smaller ears, and softer and much thicker pelage. Color above deep yellowish brown, varied with blackish; below grayish white; nose not yellowish as in the *A. xanthorhinus* group; upper surface of feet soiled yellowish white; tail bicolor, brownish above, whitish gray below; ears small, slightly overtopping the fur, scarcely different in coloration from the surrounding pelage.

Measurements.—Adult male: Total length, 127 mm.; tail vertebræ (mutilated in life), 40; hind foot 20. Adult female: Total length, 145; tail vertebræ, 55; hind foot 20. Skull, adult female: Total length, 24.6; basal length, 21; greatest breadth, 11.8; interorbital breadth, 4; length of nasals, 10; palatal length, 9.5; diastema, 6; palatal foramina, 5.2; upper molar series, 3.5. There is no interparietal.

This species is represented by only two specimens, collected on the upper Rio Chico de Santa Cruz, in the Cordilleras, by Mr. Peterson, Feb. 10, 1897. Both specimens have been identified as this species by Mr.

Thomas, the type locality of which is Monteith Bay, Straits of Magellan. Not compared by me with the type.

Mr. Peterson's notes state that both specimens, a pair, were caught together "in heavy grass and brush, near a small brook."

This species, if properly referable to *Oxymycterus*, is the smallest member of the genus, so far as at present known, being considerably smaller even than *O. microtis*.

OXYMYCTERUS MICROTIS Allen.

(Plates IX, Fig. 4, Skull; X, Fig. 7, Teeth.)

Oxymycterus microtis Allen, Bull. Am. Mus. Nat. Hist., XIX, 189, May 9, 1903. Pacific slope of Cordilleras, upper Rio Chico de Santa Cruz, Patagonia.—Thomas, Ann. & Mag. Nat. Hist. (7), XII, Aug., 1903, 243 (in text, suggesting its reference to *Notiomys*).

Adult male (type), March.—Pelage thick, short, and fine, almost mole-like in character. Pelage and general color almost exactly as in *Oxymycterus lanosus* Thomas, but twice the size of that species, with tail one half shorter and fore claws large, fossorial. Above dark yellowish brown; underparts whitish gray, the plumbeous underfur tinging the otherwise whitish surface; top and sides of nose dark grayish brown, without any tinge of yellow or rufous; ears very small, scarcely reaching the surface of the short fur, concolorous with the enclosing fur; tail very short, but little exceeding the length of the hind foot, very thickly clothed, dark brown, only slightly lighter below than above; upper surface of feet grayish brown, the toes lighter, yellowish white; soles naked, dark flesh-color.

A second spceimen is exactly similar in coloration, except that the ventral surface has a slight wash of buff, apparently due to staining.

Measurements.—Total length (type), 138 mm.; tail vertebræ, 28; hind foot, 21; longest fore claw, 6. Skull, total length, 27.6; basal length, 23.6; zygomatic breadth, 12.5; width of brain case, 12; interorbital breadth, 5; length of nasals, 10.5; palatal length, 10; palatal foramina, 5; diastema, 6.3; upper molar series, 3.5; length of lower jaw (inner base of incisors to posterior border of condyle), 15; height at condyle, 5.5; lower molar series, 3.4.

Represented by two specimens—a skin and skull, and a skin and skeleton—collected on the Pacific Slope of the Cordilleras, at the head of the Rio Chico de Santa Cruz.

Externally *Oxymycterus microtis* is a miniature of *Akodon macronyx* with a relatively much shorter tail. It exactly resembles in coloration above and in the texture of the pelage *Oxymycterus lanosus*, but the latter has whiter under parts, is very much smaller, has a much longer tail, and small, non-fossorial claws; but the skulls of the two are very similar in general contour, differing only in size and slightly in details. *O. microtis* thus combines the large fossorial claws of the *Akodon* (*Chelemys*) *macronyx* group with the cranial characters and weak dentition of the *O. lanosus* type. The narrow line separating *Akodon* and *Oxymycterus* is thus still further narrowed by the present annectent link.

Since the foregoing description was published Mr. Oldfield Thomas (*l. c.*) has expressed the opinion that, "From the descriptions given it seems not impossible that both '*Hesperomys* (*Acodon*) *Michaelseni*,' Matchie, and '*Oxymycterus microtis*,' Allen, belong to *Notiomys*, as their long claws, short tails, and very small molars agree precisely with what is found in that group." With the skull and skins of *O. micropus* before me, however, I see no reason for not viewing the species as far better referable to *Oxymycterus* than to *Notiomys*, judging *Notiomys* by the published figures of the species, including the skull.

Order FERÆ.

Suborder PINNIPEDIA.

Family *PHOCIDÆ*.

The Phocids or Earless Seals are represented in the southern hemisphere by five species, referable to as many genera, of which three have been recorded from the Straits of Magellan, the coast of Patagonia, or the Falkland Islands, and hence come within the limits of the present treatise. These are the Leopard Seal (*Hydrurga leptonyx*), Weddell's Seal (*Leptonychotes weddellii*), and the Sea Elephant (*Mirounga leoninus*). There is also a record of the capture of several examples of the Crab-eating Seal (*Lobodon carcinophaga*) near San Isidro, a few miles north of the city of Buenos Aires;[1] but otherwise than this both this species and Ross's Seal (*Ommatophoca rossii*) are known only from the vicinity of the pack-ice of the antarctic seas. Although the occurrence of *Lobodon*

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[1] Berg, Com. Mus. Buenos Aires, I, 1898, p. 15.

carcinophaga in the Rio de la Plata must have been entirely fortuitous, this species is here included, since its capture there in several instances implies its occasional occurrence on the coast of Patagonia.

Genus HYDRURGA Gistel.

Stenorhinque F. Cuvier, Mém. du Mus., XI, 1824, 190.

Stenorhinchus F. Cuvier, Dict. des Sci. Nat., XXXIX, 1826, 549. Type and only species, *Phoca leptonyx* Blainville.

Stenorhyncus F. Cuvier, Dict. des Sci. Nat., LIX, 1829, 463 (same as above).

Stenorhynchus Lesson, Man. Mamm., 1827, 199.

Stenorhincus McMurtrie, Cuvier's An. Kingd., abr. ed., 1834, 71.

"*Hydrurga* Gistel, Naturg. Thierreichs, 1848, p. xi."—T. S. Palmer, Science, n. ser., X, No. 249, Oct. 6, 1899, 494; Index Gen. Mamm., 1904, 337.

Ogmorhinus Peters, Monatsb. Akad. Berlin, 1875, 393, footnote. New name for *Stenorhynchus*, preoccupied in carcinology and entomology.

Stenorhynchotes Turner, Zoöl. Challenger Exp., pt. lxviii, 1888, 63, footnote. Not adopted, but mentioned as a modification of *Stenorhynchus* that could have been advantageously adopted in place of *Ogmorhinus*.

As has long been known, the generic name *Stenorhinchus* F. Cuvier, 1826, modified by Lesson in 1827 to *Stenorhynchus*, and by its proposer, in 1829, to *Stenorhyncus*, is preoccupied by *Stenorhynchus* Lamark, 1818, for a genus of Crustacea, and again in 1823, and still again in 1825, for different genera of insects. On this account Peters in 1875 proposed to replace it with *Ogmorhinus*. But there appears to have been already an earlier name than *Ogmorhinus*, as recently shown by Palmer, namely, *Hydrurga* Gistel, 1848, which should of course be adopted in place of *Ogmorhinus*.

HYDRURGA LEPTONYX (Blainville).

Sea lion from islands Falckland, Blainville, Journ. de Phys., XCI, Oct., 1820, 287, 288. Description of a skull in Museum of College of Surgeons, London, labelled as having come from "iles Falckland."

Phoca leptonyx Blainville, *ibid.*, 297, 298, fig. 5 of pl. published Dec., 1820. Stuffed specimen in collection of "M. Hauville, au Havre," with the same dentition as the skull described on pp. 287, 288. Also said to have come from the "environs des îles Falckland ou Malouines."

Phoca leptonyx Desmarest, Mamm., I, 1820, 247 (ex Blainville). See also note on p. 243, under *Phoca leporina.*—G. Cuvier, Ossem. foss., V, i, 1823, 207, pl. xviii, fig. 2. Same specimen.

Seal from New Georgia, Home, Philos. Trans., 1822, pt. i, 240, pl. xxix, skull; Lect. Comp. Anat., III, 1823, 118; IV, 1823, pl. xx, skull. The same skull described by Blainville, as coming from the Falkland Islands, but here said to have come from the Island of New Georgia.

Stenorhinchus leptonyx F. Cuvier, Dict. des Sci. Nat., XXXIX, 1826, 549. "Iles Malouines et de la Nouvelle-Géorgie." From Blainville and Home.

Stenorhynchus leptonyx Lesson, Man. Mamm., 1820, 199.—Nilsson, Arch. f. Naturg., 1841, pt. i, 307.—Owen, Ann. & Mag. Nat. Hist., XII, 1843, 232.—Gray, Zoöl. Erebus and Terror, Mamm., 1844, 6, pl. iii, animal, pl. iv, skull; Cat. Seals and Whales Brit. Mus., 1866, 16; and in his subsequent papers.—Jacquinot & Pucheran, Voy. au Pole Sud, Zool., III, Mamm. et Ois., 1853, 27, "terres australes, au sud-est du cap Horn"; Atlas, 1842–1853 (circa 1842), pl. ix, animal and skull.—Abbott, P. Z. S., 1868, 192 (Falkland Islands).—Sclater, *ibid.*, p. 192, footnote, and p. 527 (Falkland Islands).—Cunningham, Nat. Hist. Strait Magellan, 1871, 182. Magellan Strait.—Flower, Cat. Osteol. Coll. Roy. Coll. Surgeons, II, 1884, 211. Tasmania, New Zealand, Falkland Islands, New Georgia (includes the Blainville and Home specimen).—Borchgrevinck, First on Antarctic Continent, 1901, 65, 170, 230, 236, near Victoria Land.

Ogmorhinus leptonyx Peters, Monatsb. Akad. Berlin, 1875, 393.—Allen, N. Am. Pinnipeds, 1880, 466.—Turner, Zoöl. Challenger Exp., pt. lxviii, 1888, 64.—Barrett-Hamilton, Rep. Southern Cross Coll., 1902, 23–34, exhaustive general account.—Wilson, *ibid.*, 71–73, distribution and habits.—Bruce, Proc. Phys. Soc. Edinb., XII, 1892–1894 (1894), 380, near Graham Land; Rep. 63d Meet. Brit. Assoc., 1893 (1894), 807.—Bernacchi, To South Polar Regions, 1901, 319, 325, with text cuts of animal, from life.

Ogmorhynus leptonyx Cook, First Antarctic Night, 1901, 256, 281, 383, animal, from photographs.

Phoca homei Lesson, Dict. class. d'Hist. Nat., XIII, 1828, 417. New name for *Phoca leptonyx* Blainville.

Hydrurga leptonyx R. J. P[ocock], Rep. Southern Cross Coll., 1902, 26 (footnote).

This species is unrepresented in the collections made by the Princeton University Expeditions to Patagonia, but it has been repeatedly recorded from the Falkland Islands. Dr. Sclater (P. Z. S., 1868, 527) states that Mr. A. A. Lecompte shot, in 1867, "a single Sea Leopard (*Stenorhynchus leptonyx*) in a remote part of Stanley Harbour, being the only specimen of this animal met with during his stay in the Falklands." Captain C. C. Abbott (*l. c.*, p. 192), during his residence there, met only a single specimen, "washed ashore dead near Port Louis." Mr. Barrett-Hamilton also records two skulls in the British Museum taken on the Falkland Islands, in the list of specimens given by him in his paper on the Mammalia of the *Southern Cross* Collections (pp. 32, 33).

The several recent South Polar expeditions report this seal as found in some frequency on the pack-ice near Graham Land and Victoria Land, where it is the most numerous of the several species found in these high latitudes. It has been taken also at New Georgia and on the shores of New Zealand.

The type locality of *Phoca leptonyx* Blainville may be considered as somewhat in doubt, as it is evident that the specimen described (*l. c.*, pp. 297, 298) in connection with the bestowal of the name (on p. 298) must be considered as the type, rather than Blainville's specimen No. 2 ("2°. Sea lion from islands Falckland"), described on pages 287 and 288. The former—the type specimen—he says "à été rapportée des mers du sud, et, à ce qu'il paroit, des environs des îles Falckland ou Malouines." The other specimen, belonging to the "college des chirurgiens à Londres," and labelled as from the Falkland Islands, was, two years later, described and figured by Home (*l. c.*) as a "Seal from New Georgia," which place appears to have been the correct locality of the specimen.[1] It is apparently, therefore, fair to assume the Falkland Islands as the type locality rather than the Island of New Georgia.

The history of this seal is very fully given by Mr. Barrett-Hamilton in his report on the Mammalia of the *Southern Cross* Collections, including its bibliography, distribution, habits, external appearance, and cranial characters, which is admirably supplemented in the same work by Mr. Wilson's summary of recent observations of the animal in life, based on the accounts of the various explorers who have met with it in the pack-ice of the Antarctic.

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[1] On this point see Barrett-Hamilton, who has gone into the history of these two important specimens in considerable detail in his Report on the Mammalia of the *Southern Cross* Expedition (pp. 26, 27).

Genus LEPTONYCHOTES Gill.

Leptonyx Gray, Charlesworth's Mag. Nat. Hist., I, Nov., 1837, 582. Type, *Otaria weddelli* Lesson. Preoccupied in ornithology.

Leptonychotes Gill, Arrang. Fam. Mamm., 1872, 70. New name for *Leptonyx* Gray, preoccupied.—Allen, N. Amer. Pinn., 1880, 418, 463, 467.—Turner, Zoöl. Challenger Exped., pt. lxviii, 1888, 20. —Barrett-Hamilton, Rep. Southern Cross Coll., 1902, 17.

Pœcilophoca Flower & Lydekker, Mamm. Liv. and Ext., 1891, 605. New name for *Leptonyx* Gray, preoccupied = *Leptonychotes* Gill, 1872.

This genus was made known by Gray in 1837, on the basis of specimens obtained by Captain Fitzroy on the coast of Patagonia, more fully described and figured in 1844, in the "Zoölogy of the Erebus and Terror," but he unfortunately adopted for it the preoccupied name *Leptonyx*, replaced by Gill in 1872 by *Leptonychotes*, and again in 1891 by *Pœcilophoca* proposed by Flower and Lydekker, apparently in ignorance of *Leptonychotes* Gill.

LEPTONYCHOTES WEDDELLII (Lesson).

Sea Leopard Weddell, Voy. towards the South Pole, 1825, 22, with plate of animal entitled "Sea Leopard of South Orkneys."

Otaria weddellii Lesson, Férussac's Bull. Sci. Nat., VII, 1826, 437, 438. Based on the Sea Leopard of Weddell, as above (name spelled *Otaria weddelii* on p. 438).

Stenorhyncus weddellii Lesson, Man. de Mamm., 1827, 200.

Stenorhynchus weddellii Owen, Ann. & Mag. Nat. Hist., XII, 1843, 332. —Gill, Proc. Essex Inst., V, 1866, 6.

Leptonyx weddellii Gray, Charlesworth's Mag. Nat. Hist., I, Nov., 1837, 582; List Mamm. Brit. Mus., 1843, 102; Zoöl. Erebus and Terror, Mamm., 1844, 7, pl. v, animal, pl. vi, skull. Santa Cruz River, east coast of Patagonia, Capt. Fitzroy. Also of Gray's later papers and works on Seals.— Hatcher, Narrative, 1903, 77. Corriken Aike.

Leptonychotes weddellii Allen, N. Amer. Pinnipeds, 1880, 467.—Turner, Zoöl. Challenger Exp., pt. lxviii, 1888, 20. Betsey Cove, Kerguelen.—Cook, First Antarctic Night, 1901, 265, 281, 283, animal, from photographs.—Albert, Act. Soc. scient. du Chili, XI, Dec., 1901, 221 (casual at Juan Fernandez and Mocha Islands).—Barrett-Hamilton, Rep. Southern Cross Coll., 1902, 17–23, monographic.—Wilson, *ibid.*, 69–71, distribution and habits.

P[*œcilophoca*] *weddelli* Flower & Lydekker, Mam. Liv. and Ext., 1891, 605.

Leptonyx leopardinus Wagner, Schreber's Säug. Suppl., VII, 1846, 38.

Stenorhynchus leptonyx Moseley, Notes by a Naturalist, etc., 1879 (in error, *apud* Barrett-Hamilton). Kerguelen Island.

Leopardine Seal, Jameson, in Weddell's Voy. towards the South Pole, 1823, 23, 134.

Phoca leopardina Hamilton, Amphib. Carn. in Jardine's Nat. Library, VI, 1839, 183, and on pl. xii and in table of contents. Attributed to Jameson and = Leopardine Seal of Jameson, as above.

This species is unrepresented in the material at present available for examination from Patagonia, but Hatcher speaks of it as common off the coast at Corriken Aike. The earliest record of its occurrence in Patagonia is Gray's reference in 1843 to the specimens obtained by Capt. Fitzroy at the mouth of the Santa Cruz River, on the east coast of Patagonia in his "List of the Specimens of Mammalia in the British Museum" (1843, p. 102), and in the "Zoölogy of the Erebus and Terror" (Mamm., 1844, p. 7, and figured in plates v and vi).

Mr. Hatcher thus refers to its presence in numbers off Corriken Aike in September and October, 1896: "On quiet days, when the tides were running at their highest, the waters immediately fronting the shingle-covered beach were frequented by considerable numbers of *Leptonyx weddeli*, the common haired seal or sea leopard of this region. Occasionally these animals would approach quite near the beach, just beneath where we were engaged with our fossils, and thrusting their heads far out of the water remain stationary for a moment, apparently intent on ascertaining the meaning of our presence." (Narrative, p. 77.)

According to Albert (*l. c.*), a specimen was taken at Juan Fernandes Island in 1865, and the species is seen every two or three years about Mocha Island, coast of Chili.

Mr. Wilson (*l. c.*, p. 69) states that Weddell's Seal is a shore seal, and is not met with in the ice-pack. It ranges, however, very far south, being found, he says, "in great numbers on the coast of South Victoria Land, and is the species most commonly met with in Ross's Sea. At almost the farthest southern point reached by the *Southern Cross* Expedition these seals were numerous, and even in a piece of water south of the edge of the Great Barrier, which apparently communicated under ice with the sea, a number of them were found. . . .

"Weddell's Seal was the only species found breeding in any considerable numbers by the *Southern Cross* Expedition. Some dead young seals were found buried in guano at Camp Ridley on Cape Adare, but apparently no Weddell's Seals breed there now, though in Robertson Bay, close by, a large number of them were breeding, and many young were born." The date of the birth of the young is given as September.

The species was first named by Lesson in 1826, his account being based entirely on the description (by Professor Jameson) and drawing published by Captain Weddell, the previous year, in his "Voyage towards the South Pole" (p. 22). Professor Jameson's description is as follows: "Leopardine seal, the neck long and tapering; the head small; the body pale-greyish above, yellowish below, and back spotted with pale white. This species to be referred to the division Stenorhinque, of F. Cuvier; the teeth, however, do not quite agree with those of his Phoque Septonyx [sic], nor with those of Sir E. Home, in pl. xxix of the Philosophical Transactions for 1822."

Yet Lesson, believing that it had small ears which had been omitted by error in the drawing, referred it to the genus *Otaria*, but afterwards (1827) to the genus *Stenorhyncus*. Weddell brought home an "excellent specimen," which he presented to the Edinburgh Royal Museum, and which was later described in Dr. Robert Hamilton's "Amphibious Carnivora" (Jardine's Naturalist's Library, Vol. VI, 1839, pp. 183–187, pl. xii). This specimen evidently came from the South Orkneys (latitude 60° 37′ S.), where Captain Weddell says his men killed quite a number of the animals, and that he saw others off the South Shetlands. This specimen, according to Barrett-Hamilton (*l. c.*) is now in the new Edinburgh Museum of Science and Art.

Gray, in 1837, gave the first intelligible description of the species, from two specimens, skins and skulls, obtained by Captain Fitzroy at the mouth of the Santa Cruz River, on the coast of Patagonia, but he gave the locality simply as the "Southern seas." In the Zoölogy of the *Erebus* and *Terror* he redescribed these specimens in greater detail, adding the locality of capture, and giving figures of both the animal and skull. In both these accounts he adopted the specific name appropriately given it by Lesson, and by which it has since been uniformly known, except in one or two instances of inadvertence. The only synonym, and one which has never had currency, is the *Phoca leopardina* of Hamilton, who thus rendered the "Leopardine Seal" of Jameson, contained in an inedited contribution to Weddell's "Voyage," and wrongly attributed the name to Jameson.

Genus LOBODON Gray.

Lobodon Gray, Zoöl. Voy. Erebus and Terror, Mamm., 1844, 5. Type and only species, *Phoca carcinophaga* Jacquinot & Pucheran.

Lobodon carcinophaga (Jacq. & Puch.).

Phoca carcinophaga Jacquinot & Pucheran, Voy. au Pole Sud, Atlas, Mamm., 1842 (circa), pl. x, animal, pl. x*a*, skull. No description. South polar seas, "entre les îsles Sandwich et les îsles Powels."

Lobodon carcinophaga Gray, Zoöl. Voy. Erebus and Terror, Mamm., 1844, 5, pl. i (animal), pl. ii (skull); Cat. Seals Brit. Mus., 1850, 10; and of Gray's subsequent works and papers.—Jacquinot & Pucheran, Voy. au Pole Sud, Zool., III, 1853, 27–30.—Allen, N. Amer. Pinnipeds, 1880, 466.—Cook, First Antarctic Night, 1901, 256, 281, cuts from photographs.—Barrett-Hamilton, Rep. Southern Cross Coll., 1902, 35–45, monographic.—Wilson, *ibid.*, 74–76, habits and distribution.—Berg, Com. Mus. Buenos Aires, I, No. 1, Aug., 1898, 15. Accidental in Rio de la Plata.

Stenorhynchus carcinophagus Flower, Cat. Osteol. Vertebr. Anim. Mus. College Surgeons, III, 1884, 213.

Ogmorhinus carcinophagus Turner, Zoöl. Challenger Exped., XXVI, pt. lxviii, 1888, 64.

Stenorhynchus serridens Owen, Ann. & Mag. Nat. Hist., XII., Nov., 1843, 332.

This species was first made known through the publication of Jacquinot and Pucheran's plates of mammals in the Atlas of the Zoölogy of the "Voyage au Pole Sud et dans l'Oceanie," which appeared at various dates between 1842 and 1853. Plates 10 and 10*a* carry the name *Phoca car-*

cinophaga, the first giving a view of the animal, the other excellent figures of the skull and teeth. The exact date of their publication is in doubt, but they must have appeared in 1842 or early in 1843, as they are cited by Gray in 1844, in the Zoölogy of the *Erebus* and *Terror*, where he claims priority for Jacquinot and Pucheran's name over *Stenorhynchus serridens* Owen, published in the "Annals and Magazine of Natural History" for November, 1843.

The Crab-eating Seal is one of the most common of the seals found in the pack-ice of the Antarctic regions, outside of which, so far as known, it is rarely seen. There is no record of its appearance in the Tierra del Fuego Archipelago, nor on the shores of Patagonia, but it has found its way on two or three occasions, as recorded by Berg,[1] to the Rio de la Plata, near Puerto de Ensenada and San Isidro, in latitude about 34°30′ south. Its more or less frequent occurrence on the coast of Patagonia seems, therefore, more or less probable. Its casual straggling to the mouth of the La Plata is somewhat parallel to the occurrence of the Crested Seal (*Cystophora cristata*) in Long Island Sound and on the coast of France, and the Harbor Seal (*Phoca vitulina*) on the coast of North Carolina, 300 to 500 miles south of their normal southern limit.

Its history, so far as known, is very fully detailed by Barrett-Hamilton, who gives (*l. c.*, pp. 35–45) its bibliography, synonymy, distribution, habits and external and cranial characters, based on the examination of a large number of specimens obtained by the *Southern Cross* expedition, the Belgian Antarctic expedition, and Ross's Antarctic expedition of 1839–43. This is supplemented by Wilson's further notes (*l. c.*, pp. 74–76) on its habits and distribution.

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[1] Mr. Berg's account is so short and of so much interest that it is here transcribed in full:

"*Lobodon carcinophagus* (H. J.) Gr. en el Río de la Plata. — Esta foca, que habita la región antártica, aparece en aislados casos también en regiones más septentrionales. Así, por ejemplo, menciona el Dr. Burmeister en su "Atlas de la description physique de la République Argentine. II. Die Seehunde der Argentinischen Küsten" (1883), haber visto el cráneo de uno de estos pinipedios que había llegado vivo al Rio Santo Cruz (φ 50°), sobre un témpano de hielo.

"Más digno aún de mención es el hecho de haberse encontrado un ejemplar de esta especie en el Río de La Plata, cerca del Puerto de Ensenada, que se conserva en el Museo de La Plata, y otro en la proximidad de San Isidro, al norte de Buenos Aires (φ 34°28), en el mes de Junio del año corrinete, que se encuentra actualmente en nuestro Museo.

"Este último ejemplar, un macho mide 2 metros y 65 centimetros, y es de color blanco impuro, presentando algunas manchas irregulares amarillentas y poco definidas, que no fueron notadas en el animal antes del embalsamamiento."—C. Berg, in Comunicaciones del Museo nacional de Buenos Aires, Tomo I, No. 1, 24 de Augusto de 1898, p. 15.

Genus MIROUNGA Gray.

Macrorhine F. Cuvier, Mém. du Mus., XI, 1824, 200, pl. xiii, fig. 2, *d*, *e*, *f*. Type, *Phoca proboscidea* Péron = *Phoca leonina* Linn.

Machrorhinus F. Cuvier, Dict. des Sci. Nat., XXXIX, 1826, 552; LIX, 1829, 464 = *Macrorhine*, F. Cuvier, 1824. Preoccupied by *Macrorhinus* Latreille, 1825, for a genus of Coleoptera.

Macrorhyna Gray, Griffith's An. King., I, 1827, 180 (err. typ. for *Macrorhinus*, *apud* Gray, Cat. Seals, 1850, 34).

Mirounga Gray, Griffith's An. King., V, 1827, 179 (in part). Type, by elimination, *Phoca proboscidea* Péron.

Morunga Gray, Zoöl. Voy. Erebus and Terror, Mamm., 1844, 4; List Osteol. Spec. Br. Mus., 1847, 33. An emendation of *Mirounga* and restricted to *Phoca proboscidea* Péron.

Rhinophora Wagler, Nat. Syst. Amphib., 1830, 27. Type, *Phoca proboscidea* Péron.

Cystophora Nilsson, Vet. Akad. Hand., 1837, —; Arch. f. Naturg., 1841, i, 323 (in part; not of Nilsson, 1820, when *Cystophora* included only *Phoca cristata* Erxl.). Also of Peters, in part.

Physorhinus Gloger, Hand- u. Hilfsbuch der Naturg., 1841, 163. Type, *Phoca proboscidea* Péron.

The Sea Elephant was removed from the genus *Phoca* in 1824 by F. Cuvier as the type of a special genus to which he applied the French term Macrorhine, which he first used in its proper techinal form, *Macrorhinus*, in 1826 for the same group. In the meantime (1825) Latreille gave the same name to a genus of coleopterous insects. According to present usage the name Macrorhine is untenable, and its technical equivalent is preoccupied by one year by Latreille's *Macrorhinus*.

In 1827 Gray proposed the genus *Mirounga*, to include the Sea Elephant and Hooded Seal, which latter had already been made the type of the genus *Cystophora* by Nilsson in 1820. The type of *Mirounga* would thus become, by restriction, the Sea Elephant, to which Gray himself, in 1847, restricted the name, at the same time emending it to *Morunga*. In 1830 Wagler proposed the genus *Rhinophoca*, with *Phoca proboscidea* Péron as the type and only species. Gloger in 1841 again renamed the genus *Physorhinus*.

From the foregoing it is evident that the proper name of the Sea Elephant group is *Mirounga* Gray, 1827.

MIROUNGA LEONINA (Linnæus).

Sea-lyon Anson, Voy. round the World, 1748, 122, pl. entitled "A Sea-Lion and Lioness," Island of Juan Fernandez.

Skull of Seal brought by Lord Anson from Southern Seas, Home, Comp. Anat., IV, 1823, pl. xviii. See also Nilsson, Arch. f. Naturg., 1841, i, 324; Flower, P. Z. S., 1881, 146; Cat. Osteol. Coll. Mus. Roy. Coll. Surgeons, II, Mamm., 1884.

Phoca leonina Linn., Syst. Nat., 1758, 37. Based exclusively on the "Sea-lyon" of Anson.

Loup marin Pernetty, Voy. aux Iles Malouines, II, 1769, 447, 561, pl. ix*. Figure copied from Anson, slightly altered.

Phoca leonina Schreber, Säug., III, 1776, 297, pl. lxxxiii*a*. Based on the above. Plate after Anson. — Shaw, Gen. Zoöl., I, 1800, 268, pl. lxxiii, after Anson.

Macrorhinus leoninus Allen, N. Am. Pinnipeds, 1880, 466 (synonomy and distribution); Fur Seal Arbitra., Case of United States, 1892, 388, economic history. — Flower, P. Z. S., 1881, 145–162 (Falkland Islands, skull and dentition, etc.); Cat. Osteol. Coll. Roy. Coll. Surgeons, II, 1884, 215. — Turner, Zoöl. Challenger Exp., pt. lxviii, 1888, 3–19, pls. i–iv. Kerguelen and Heard Islands; external characters and osteology. — Albert, Act. Soc. scient. du Chili, XI, Dec., 1901, 217–220. Synonymy, description, history, habits, products, etc.

Phoca elephantina Molina, Sag. Stor. Nat. Chili, 1782, 260. New name intentionally given for *Phoca leonina* Linn.

Morunga elephantina Gray, Zoöl. Erebus and Terror, Mamm., 1844, 4, 8, pl. ix, animal, female, pl. x, skull, female; Cat. Seals and Whales, 1866, 38, fig. 13, skull. Also of Gray's various later works.

? Phoca porcina Molina, Sag. Stor. Nat. Chili, 1782, 279 (young).

Phoca proboscidea Péron, Voy. aux Terres. Austr., II, 1816, 34 (32–66), pl. xxiii, animal. — Desmarest, Nouv. Dict. d'Hist. Nat., XXV, 1817, 550, pl. G44, fig. 2, animal; Mamm., I, 1820, 238.

Mirounga proboscidea Gray, Griffith's An. King., V, 1827, 180.

Morunga proboscidea Sclater, P. Z. S., 1868, 227. Falkland Islands (nearly extinct).

Cystophora proboscidea Nilsson, Vet. Akad. Hand., 1837, ——; Arch. f. Naturg., 1841, i, 323. With important critical and historical comment.

Phoca resima Péron, Voy. aux Terres Austr., II, 1816, 65. Iles Saint Paul et Amsterdam.

Phoca coxii Desmarest, Nouv. Dict. d'Hist. Nat., XXV, 1817, 559. *Phoca resima* Péron, 1816.

Phoca ansonina et *P. ansonii* Blainville, Journ. de Phys., XCI, 1820, 299, 300. A composite of *Phoca leonina* Linn. and *Otaria jubata* auct.

Phoca ansonii Desmarest, Mamm., I, 1820, 239. From Blainville. (*Cf.* Nilsson, Arch. f. Naturg., 1841, i, 325.)

Mirounga patagonica Gray, Griffith's An. King., V, 1827, 180. *M. elephantina* Gray, *apud* Gray in later works.

Phoca dubia Fischer, Syn. Mamm., 1829, 235. Iles Malouines: based on a young specimen doubtfully referred by F. Cuvier (Dict. des Sci. Nat., XXXIX, 1826, 552) to his *Macrorhinus proboscideus.*

Cystophora falklandica Peters, Monatsb. Akad. Berlin, 1875, 394, footnote. Falkland Islands; Loup marin of Pernetty.

Cystophora kerguelensis Peters, Monatsb. Akad. Berlin, 1875, 394, footnote. Kerguelen Land.

Lord Anson's Sea-lion, Forster, Voyage round the World, II, 1777, 527–528. South Georgia; description of the animal; referred to in a footnote, p. 528, as the *Phoca leonina* Linn.

Sea Elephant, Weddell, Voy. towards the South Pole, 1825, 134–137. South Shetlands; habits, and destruction for oil.

So far as the evidence has been presented, there seems to be no good reason for recognizing more than a single species of Sea Elephant in the southern seas, with which the California Sea Elephant is so closely related as to have been considered by some authors as doubtfully distinct from the southern species. Three names have been, at one time or another, more or less current for the species, as shown by the above citations, namely, *leonina* (*Phoca leonina* Linn., 1758), *elephantina* (*Phoca elephantina* Molina, 1782), and *proboscidea* (*Phoca proboscidea* Péron, 1816). The type locality of *Phoca leonina* is Juan Fernandez Island, and of *Phoca elephantina* the coast of Chili, including the Juan Fernandez Islands, the name having been proposed as a substitute for *Phoca leonina.* Péron gave the name *Phoca proboscidea* to the Sea Elephant of the southern seas at large. *Phoca resima* of the same author has special reference to the Sea Elephant "des St.-Pierre et St.-Paul d' Amsterdam (*Phoca Resima*, N.) dont MaCartney, Cox et Mortimer nous ont successivement donné l'intéressante histoire," afterwards renamed *Phoca coxii* by Desmarest. In 1875 Peters proposed to call the Falkland Islands animal, the Loup marin of Pernetty, *Cystophora falklandica*, and the Kerguelen animal *Cystophora kerguelensis*. In this connection Peters recognized five species of Sea Elephant, as follows: 1, *Cystophora leonina* (Linn.); 2, *C. falklandica*, sp. nov., Sea Lion of Pernetty; 3, *C. proboscidea* (Péron); 4, *C. angustirostris* (Gill), California Sea Elephant; 5, *C. kerguelensis*, sp. nov., The two new names are given in a footnote, without indication of any distinctive characters, the record merely expressing the author's opinion respecting probable species of Sea Elephants. Subsequent writers have almost unanimously referred all of the Sea Elephants of the southern hemisphere to a single species, *leonina* Linn.[1]

GEOGRAPHICAL DISTRIBUTION. — "Sea-elephants were formerly found in great abundance at nearly all of the Oceanic Islands south of the thirtieth parallel of south latitude. Kerguelen Land and Heard Island were especially favorite resorts for them. They were also abundant at the Falkland Islands, Staten Land, South Georgia, throughout the Tierra del Fuego Archipelago, on the coasts of Patagonia, and as far north on the Pacific coast of South America as Mas-à-Fuero and Juan Fernandez. They also occurred in large numbers at the Tristan d'Acunha group, the Crozets, the Prince Edward Islands, St. Paul and Amsterdam Islands, the coasts and islands of southern Australia and New Zealand, and the numerous islands to the southward and eastward of New Zealand. At most of these points, however, they became long since practically exterminated, though still occurring at Kerguelen Land, Heard Island, and at a few other points in sufficient numbers to render sea-elephant hunting attractive to the few sealers and whalers who still frequent these waters.[2]

" HISTORY OF SEA-ELEPHANT HUNTING. — Sea-elephant hunting began early in the present century, and for years, either exclusively or in conjunction with whaling, proved a lucrative employment, largely monopolized by Americans. From the incomplete statistics at hand, sea-elephant hunting appears to have been begun in 1803 on the coast of Patagonia, and was prosecuted there more or less regularly till 1819, during which period a total of about 15,000 barrels of sea-elephant oil appears to have been taken from Patagonia alone. In 1817 about 2,500 barrels were taken at the Falkland Islands, and also about 2,500 barrels in 1837. In 1820–'22 about 4,000 barrels were taken at the South Shetland Islands, and again about 2,000 barrels at the same islands in 1831. About 2,000 barrels are accredited to the South Georgian Islands in 1829. In 1838 5,000 barrels were obtained at Kerguelen Land; in 1838 and 1839 about 5,000 barrels were taken at the Crozet Islands. During the decade 1840–'50 nearly half the take of sea-elephant oil (about 16,000 barrels), came from Kerguelen Land, the total take, so far as statistics are available, being about 37,000 barrels. About this time the sea-elephant hunters began to visit Heard Island, and of the 84,000 barrels taken during the decade of 1850–'60, four-fifths were obtained at Kerguelen Land and Heard Island (the latter first discovered in 1853). During the following decade (1860–'70) about 36,000 barrels were reported as taken, nearly all of which came from the two last-named islands. The same is true of the decade from 1870 to 1880, but the amount of oil declined for this period to about 30,000 barrels, the decline being especially marked toward the close of the decade. It has been stated that during fifty years, beginning with the year 1837, not less than 175,000 barrels of sea-elephant oil were obtained from Kerguelen Land and Heard Island. As in later years, young of all ages as well as adults were taken, regardless, also, of season and condition, the number of sea-elephants annually destroyed at these seal islands must have been in the neighborhood 40,000 individuals, or a total of probably over 2,000,000.

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[1] "The evidence upon which Dr. Peters has based four supposed species of southern Elephant Seal, viz., *leonina*, *falklandica*, *proboscidea*, and *kerguelensis*, is still more shadowy; but these were only put forth by him as suggestions of possibilities, not as ascertained facts."—Flower, P. Z. S., 1881, p. 162.

[2] To the above it may be added that Sea Elephants are not found in the high Antarctic latitudes, appearing not to reach the pack-ice and the shores of the Antarctic lands, the favorite haunts of the other southern Phocids.

"At these islands certain extensive beaches are described as being inaccessible from the water on account of the boisterous seas which constantly prevail, while precipitous cliffs render it impossible to transport the oil from these beaches to the vessels. Here great numbers of sea-elephants annually haul up in security to breed, thus preserving the species from extermination, which doubtless otherwise would long since have overtaken them.

"More or less sea-elephant oil has been taken annually since 1880, but the amount is small in comparison with the earlier years, owing to the increasing scarcity of the sea-elephants.

"The oil is chiefly used for softening wool, and for other purposes in the manufacture of cloth, for which it is especially adapted.

"The above relates only to the operations of Americans, and even for these the published statistics are far from complete (given principally by A. Howard Clark in Goode's 'Fishery Industries of the United States'). When we add to this the enormous number of sea-elephants that have fallen a prey to sealers of other nationalities, it is not a matter for surprise that these animals have long since been practically extinct, commercially speaking, except at the few points where the physical surroundings afford them protection from their inhuman enemies."[1]

Family *OTARIIDÆ*.

The Eared Seals are separable into two supergeneric groups, distinguishable externally by differences in the character of the pelage, in the length of the ears, in coloration, and in size. These groups, while rather sharply defined, especially as regards the nature of the pelage, are hardly entitled to rank as subfamilies. In the first of these the pelage is coarse and harsh, and without underfur; the ears are rather short, and the general coloration is yellowish brown in adults, darker and more reddish brown in the young, especially on the limbs, and the species all attain large size. This group includes the genera *Eumetopias*, *Otaria*, *Zalophus* and *Phocarctos*, each, except *Zalophus*, being monotypic. They are here mentioned in the order of size, the representatives of the first attaining the largest dimensions.

The second group includes the Fur Seals of commerce, in which the pelage consists of rather long overhair, beneath which is an abundant coat of very fine, soft, thick underfur, which gives to the peltries their high commercial value. The coloration in adults is grayish, the longer hairs being dark brown tipped with gray; in old individuals the coloration becomes decidedly gray, while the young in early life are black. The underfur is generally rich brown, lighter towards the base. This group includes the two genera *Callotaria* (= *Callorhinus* Gray) and *Arctocephalus*, the former embracing the Fur Seals of the North Pacific and the latter those of the southern seas; a species was also found formerly on the coast and islands of southern and Lower California, but it is now nearly extinct.

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[1] Allen, in Proceedings of the Tribunal of the Fur Seal Arbitration, etc., Appendix to the United States Case, Vol. I, 1892, pp. 389, 390.

The following synopsis gives in brief the diagnostic characters and geographical distribution of the several genera.

SYNOPSIS OF THE GENERA.

A. Pelage harsh, without underfur; size large; color yellowish brown....... TRICHOPHOCACÆ.
  a. Molars $\frac{6-6}{5-5}=\frac{12}{10}$; palate deeply concave.
    b. Palatine bones prolonged nearly to the pterygoid hamuli, truncate posteriorly. Coasts and islands of southern South America.............................. *Otaria.*
    b.' Palatine bones ending considerably in front of the pterygoid hamuli, narrowed and emarginate posteriorly. Aukland Islands......................... *Phocarctos.*
  a.' Molars $\frac{5-5}{5-5}=\frac{10}{10}$.
    c. Palatine bones ending very far in front of the pterygoid hamuli, posterior border hollowed or emarginate; interorbital region moderately constricted; sagittal crest moderate. Molars $\frac{5-5}{5-5}=\frac{10}{10}$, a long diastema between $m^{\underline{4}}$ and $m^{\underline{5}}$. North Pacific. *Eumetopias.*
    c.' Palatines much as in *Eumctopias;* interorbital region greatly constricted; sagittal crest enormously developed; molars $\frac{5-5}{5-5}=\frac{10}{10}$, no diastema between $m^{\underline{4}}$ and $m^{\underline{5}}$. California and Japan, and Australian Seas......................... *Zalophus.*
B. Pelage soft, with abundant underfur; size much smaller; color gray, black in young. OULIPHOCACÆ.
  a. Facial portion of skull broad, short, and high; brain-case short and broad; molar teeth small. North Pacific... *Callotaria.*
  a.' Facial portion of skull slender, narrow, elongated, and sloping; molars large. Southern Seas, mainly.. *Arctocephalus.*

From the foregoing it will be seen that the Eared Seals are geographically separated into two groups, the one northern, the other southern. The former includes the genera *Eumetopias*, *Zalophus*, and *Callotaria*; the latter *Otaria*, *Phocarctos*, and *Arctocephalus*. The last-named genus, however, furnishes a partial exception to this statement, for it not only ranges northward on the west coast of South America to the Galapagos Archipelago, situated on the equator, but has also a representative — or had, it being now practically extinct — as far north as the coast of Lower California, namely, the *Arctocephalus townsendi*, described by Merriam in 1897 from Guadalupe Island. As *Callotaria* formerly ranged southward in its winter migrations to the coast of California, it must have nearly or quite met the range of *Arctocephalus*. Fur Seals were actively hunted during the first third of the nineteenth century all along the Pacific coast of North America as far south as Lower California and the islands off the west coast of Mexico, in north latitude 18° to 20°. As, however, no specimens were secured for scientific examination, and the animals have since become practically extinct, it is now impossible to determine the former southward limit of *Callotaria*, or the former northward limit of *Arctocephalus*.

While the Phocids, or Earless Seals, are circumpolar in distribution, in both hemispheres, the Eared Seals are confined, in the northern hemisphere, to the shores and islands of the Pacific Ocean, but are circumpolar in the southern hemisphere. It is noteworthy, however, that in neither hemisphere do they reach nearly so high latitudes, and never range into the pack-ice, as do most of the species of the Phocidæ, in both the Arctic and Antarctic regions.

Genus OTARIA Péron.

Otarie Péron, Ann. du Mus. d'Hist. Nat., XV, 1810, 300. The only species mentioned is Steller's Sea Lion, but he gives a reference to his "Voyage aux Terres Australes," correctly citing volume and page as "t. II, p. 37."

Otaria Péron, Voy. aux Terr. Austr., II, 1816, 37, footnote and *passim*, pp. 40–52, in part. Type, by elimination, *Phoca byronia* Blainville = *Otaria leonina* Péron, 1816, et auct. = *Phoca leonina* Molina, 1782, preoccupied by *Phoca leonina* Linn., 1758.

Otoes G. Fischer, Mém. Soc. Imp. des Sci. Nat. de Moscou, V, 1817, 445. = *Otaria* Péron, 1816.

Otaria Gray, Zoöl. Erebus and Terror, Mamm., 1844, 5, in part.

Otaria Gill, ex Péron, Proc. Essex Inst., V, 1866, 7.

Otaria Peters, Monatsb., k. p. Akad. Wissen. Berlin, 1877, 505. "*Otaria* Péron, s. s."

Platyrhyncus F. Cuvier, Dict. des Sci. Nat., XXXIX, 1826, 555 = Le Platyrhinque, F. Cuvier, Mém. du Mus., XI, 1824, pl. xv, fig. 2 (skull), in part. Type, as determined by the figured skull, *Otaria leonina* auct.

Generic Characters. — Palatine bones extending nearly to the pterygoid processes, deeply concave, truncate posteriorly. Molars in a continuous series, $\frac{6-6}{5-5}=\frac{12}{10}$. Ears short. Pelage without underfur.

General History. — The genus *Otaria* contains but a single well-established species, the *O. byronia* (= *O. leonina* or *O. jubata* of most authors) of southern South America. Various other species have been proposed, but they rest thus far on very unsatisfactory evidence, as will be noted later.

All the Seals were placed by all authors in the Linnæan genus *Phoca* till Péron, in 1810,[1] proposed to consider the Eared Seals as a new genus, "sous le nom d'*Otarie*." In 1816 he introduced, informally, the generic name *Otaria* for these animals, which he employed incidentally and consistently for them throughout his chapter on the Sea Elephant in the second volume of the "History" of Freycinet's "Voyage aux Terres Australes."[2] He mentioned here, in footnotes and in the text, three species of Eared Seals, and subsequently two others in the same volume, as follows: (1) *Otaria ursina* (pp. 39, 41, 42, 49, 52) = *Phoca ursina* Linn., based on the Sea Bear of Steller; (2) *Otaria leonina* (pp. 40, 65, etc.) = Sea Lion of Forster; (3) *Otaria jubata* (p. 40, footnote) = *Leo marinus* of Steller; (4) *Otaria cinerea* (p. 77), Iles Decrès, — not identifiable; (5) *Otaria albicollis* (p. 118), Isle Eugène. The first three of these names (*O. ursina*, *O. leonina* and *O. jubata*) are perfectly identifiable with previously described and now well-known species. The other two (*O. cinerea* and *O. albicollis*) were given to supposed new species, but so inadequately described as not to be satisfactorily identifiable.[3]

Up to this time all of the Sea Lions had been regarded as forming a single species, named *Phoca jubata* by Schreber in 1776, and all the Sea Bears, or Fur Seals, as referable to the *Phoca ursina* of Linnæus (1758). Péron thus for the first time not only separated the Otaries from the Phocids, but he also distinctly separated the Northern Sea Lion from the Southern Sea Lion, retaining for the former (very properly, as will be shown later) the specific name *jubata*, and giving a new name to the latter, which unfortunately proves to be untenable.[1]

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[1] Ann. du Mus. d'Hist. Nat., Vol. XV, 1810, p. 300, footnote. He here cites his use of the name "Otarie" (probably written by him *Otaria*) in "Voyage aux Terres Australes, t. ii, p. 37," which work was not issued until long after the sheets were printed, owing to delay with the plates. *Otaria* Péron is generally cited from the "Voyage," 1816, which appears to be its proper date.

[2] Voyage de découvertes aux Terres Australes, Historique, Tome Second, 1816 . . . Chapitre XXIII, "Histoire de l'Éléphant marin, ou Phoque à trompe [*Phoca proboscidea*, N]: Pêches des Anglois aux Terres Australes," pp. 32–66, pl. xxiii.

[3] Mr. G. W. Clark, who some years ago made them the subject of special investigation (see his valuable paper "On the Eared Seals of the Islands of St. Paul and Amsterdam, with Description of the Fur Seal of New Zealand, and an attempt to distinguish and rearrange the New Zealand Otariidæ," in P. Z. S., 1875, pp. 650–677, pll. lxx–lxxii, and 8 text cuts), considers *O. cinerea* as closely related to *Arctocephalus forsteri*, but possibly entitled to recognition as a species, without, it seems to me, very good grounds. He considers *O. albicollis* as identical with Gray's *Arctocephalus lobatus*, which is perhaps probable, though not satisfactorily provable.

In 1817 G. Fischer, evidently ignorant that Péron had established the generic name *Otaria* for the Eared Seals, proposed for them the name *Otoes*,[2] basing his name entirely on G. Cuvier's "Les Phoques à oreilles extérieures," in the "Règne Animal" (I, 1817, p. 166), his own account of which is an unabridged paraphrase of Cuvier's, even to Cuvier's error in respect to the incisors. He cites as referable to it "*Phoca jubata*, *ursina*, Lin. Gmel.," in other words, the Sea Lions (*Phoca jubata* auct.) and the Sea Bears (*Phoca ursina* auct.) as they were known to Cuvier and naturalists generally at the time, who believed there were only one species of each, both common to the Arctic and Antarctic regions. No one but Péron appears to have thought otherwise for the next ten years; even as late as 1823, G. Cuvier spoke[3] derisively of Péron's assumption that none of the seals of the "hemisphère antarctique" were "de même espèce que ceux du nord."

It consequently happens that the genus *Otoes* Fischer, 1817, is an exact synonym of *Otaria* Péron, 1816. It is therefore inadmissable to assume, as has been recently done,[4] that the name *Otoes* is available for the northern Fur Seals, on the ground that what Fischer did "was simply to apply a generic name to Cuvier's group [= "Otaries Péron"] whose name Cuvier avowedly took, which . . . . was based chiefly on the northern and not the southern fur seal." While the first part of this statement is perfectly correct, the latter is not, Cuvier's *Phoca ursina* including a southern Fur Seal ("*Phoca pusilla*") and a southern Sea Lion ("le phoque jaune de Shaw, etc.,"), as well as a citation of "Buff., Supp. VII [lege VI], pl. xlvii," which plate Buffon states is after a design from nature by Forster, which, as all investigators of the group know, relates to the Fur Seal of

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[1] The following quotations from Péron show the manner in which the two names *Otaria leonina* and *Otaria jubata* were introduced. Péron (*l. c.*, p. 40, in the text) says: ". . . (Forster, 2^{e} Voy. de Cook, tom VIII, pag. 56). L'auteur parle ici de l'Otaria Leonina, N.[a]"; and adds in a footnote to the same page:

"[a] Quelque singulier que puisse être le phénomène dont il s'agit, il n'est pas cependant particulier aux grands Phocacés des régions Australes, STELLER a observé quelque chose d'analogue sur le Lion marin du Nord [Otaria jubata, N.]" — and then follows a quotation from Steller.

[2] Mem. Soc. Imp. des Nat. de Moscou, V, 1817, p. 445.

[3] Ossem. foss., V, 1823, p. 218.

[4] *Cf.* Palmer, Proc. Biol. Soc. Washington, XIV, pp. 133, 134, Aug. 9, 1901.

New Zealand, Forster's drawing having been made at Dusky Bay, on the southeastern coast of South Island, New Zealand, March 31, 1773.[1]

In 1824 F. Cuvier[2] separated the Otaries (which he still looked upon as consisting of only two species) into two groups, under vernacular French names, as follows: (1) "Arctocéphale," and (2) "Platyrhinque." He says "nous prenons le type de ce genre Arctocéphale dans l'Ours marin, *Phoca ursina*." Of the second he says: "Le lion marin (*Phoca leonina*) paroît être le type de ce dernier genre, auquel nous donnerons la dénomination de Platyrhinque."

Two years later he introduced these terms in proper Latin form, as, respectively, *Arctocephalus* and *Platyrhyncus*[3] and says, "quoique l'un et l'autre de ces genre ne se composent encore manifestement que d'une seule espèce." One he calls "*Arctocephalus ursinus; Ursus marinus*, Steller, Novi comment. petrop., 11, p. 331"; vaguely referring also to Pernetty and Forster. The other he calls "*Platyrhyncus leoninus;* Lion marin, Steller, Nov. act. petrop., 2; Forster, 2 Voyages de Cook, t. 4; Pernetti, Voyage aux îles Malouines, t. 2, pl. 10," etc. No specimens are definitely mentioned in either of Cuvier's articles, but a skull of each genus is figured in his first paper. These illustrations are based not on Steller's animals mentioned in the text, but, in the case of *Platyrhyncus*, on the Southern Sea Lion, and in the case of *Arctocephalus* on a fur seal from the Cape of Good Hope. Cuvier's plate xv (*l. c.*) therefore determines the type for both groups, which in the case of *Arctocephalus* is the Cape of Good Hope species, *Arctocephalus antarcticus* (Thunberg), and in the case of *Platyrhyncus*, the sea lion of Patagonia and the Falkland Islands, named *Otaria leonina* by Péron. This would restrict *Otaria* to Steller's Sea Lion were it not, fortunately for the present current nomenclature of the group, that the name *Platyrhynchus* is doubly preoccupied — for a genus of birds by Desmarest in 1805, and by Thunberg in 1815 for a genus of Coleoptera.

It hence fortunately happens that the first valid restriction of *Otaria*, after the Fur Seals (*Arctocephalus*) were removed, was made in 1866, when Gill established *Eumetopias* for the sea lion of Steller, and *Zalophus* for the California Sea Lion, and Peters proposed *Phocarctos* for the Aukland Islands Sea Lion. *Otaria* is thus, by the elimination of all the other types originally included under it, restricted to the Southern Sea Lion, or the Sea Lion of Forster.

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[1] *Cf.* Forster's Descript. Anim., p. 64. Compare also Forster's "Voyage Round the World," I, 1777, p. 151, and Buffon, Hist. Nat., Suppl., VI, 1782, pp. 330, *et seq.*

[2] Mém. du Mus. d'Hist. Nat. XI, 1824, pp. 205–209, pl. xv.

[3] Dict. des Sci. Nat., Vol. XXXIX, 1826, pp. 553–555.

OTARIA BYRONIA (Blainville).

(Plate XXI, Skeleton.)

Lion marin, Pernetty, Voy. aux Iles Malouines, 1769, 447, pl. viii, fig. 1 (animal). Falkland Islands.

Phoca jubata Schreber, Säug., III, 1776, 300. In part; mainly based on Steller's *Leo marinus*, but includes "*Lion marin* Pernetty." Also, in part, of Erxleben, Zimmermann, Gmelin, Kerr, Shaw, G. & F. Cuvier, Fischer, and systematists generally until about 1830, and of some later authors.

Sea-lion, Forster, Voy. Round the World, II, 1777, 512–515.

Sea-Lion of Forster, Hamilton, Amphibious Carnivora (Jardine's Nat. Library, VI), 1839, 237, pl. xviii, animal, after Forster.

Le Lion-marin, Buffon, Hist. Nat. Suppl., VI, 1782, 358–380 (in part), pl. lxviii, "dessiné d'après nature par M. Forster."

Phoca jubata Blainville, Journ. de Phys., CXI, 1820, 294; Ostéog., Les Phoques, 1840, pll. iii (skeleton), vi (skull), and ix (dentition).—Forster, Descrip. Anim., 1844, 317. Staten Land, New Year's Island and Patagonia.

Otaria jubata Desmarest, Mamm., I, 1820, 248 (in part).—Nilsson, K. Vet. Handl. Stockholm, 1837,—; Arch. f. Naturg., 1841, i, 329 (in part).—Gray, List Mamm. Brit. Mus., 1843, 103; Ann. & Mag. Nat. Hist. (3), XVIII, 1866, 230; Suppl. Cat. Seals and Whales, 1871, 13; Ann. & Mag. Nat. Hist. (4), IX, 1872, 483; "Handlist Seals, Morses, Sea-Lions and Sea-Bears, 1874."—Tschudi, Fauna Peruana, 1844–46, 135.—Peters, Monatsb. Akad. Wissen. zu Berlin, 1866, 263, 665, 670; *ibid.*, 1877, 505.—Abbott, P. Z. S., 1868, 190, Falkland Islands.—Sclater, P. Z. S., 1868, 190, 527–529 (*passim*), Falkland Islands.—Murie, P. Z. S., 1869, 101–106, skull, male and female, Falkland Islands; Trans. Zoöl. Soc. London, VII, pt. xvi, 1872, 501–582, pll. lxvii–lxxiii; VIII, pt. xvi, 1874, 527–596, pll. lxxv–lxxxii, anatomy, Falkland Islands.—Allen, Bull. Mus. Comp. Zoöl., II, 1870, 44 (in part); Hist. N. Amer. Pinnipeds, 1880, 208.—Cunningham, Nat. Hist. Strait Magellan, 1871, 126.—Hensel, Phys.

Abhandl. Akad. Wissen. zu Berlin, 1872 (1873), 91, Lobos Islands, Uruguay; also, formerly, Lobos Islands off Sta. Catharina, Brazil.—Burmeister, Descrip. phys. Rép. Argent., III, 1879, 526–528, Atlas, 2^{me} livr., pl. viii, skulls and teeth, showing variation with age and sex. Islas de los Lobos, Argentina.—Thomas, P. Z. S., 1881, 4, Magellan Strait.—Flower, Cat. Osteol. Coll. Roy. Coll. Surgeons, II, 1884, 187–190 (special mention of the Commodore Byron Sea-Lion skull, p. 189).—Turner, Zoöl. Voy. Challenger, pt. lxviii, 1887, 29, Falkland Islands.—Philippi, An. Mus. nac. Chile, I, Zool., 1892, 5, 9, pl. i, animal.—Figueira, An. Mus. nac. Montevideo, II, 1894, 203.—Albert, Act. Soc. scient. du Chili, XI, 1901, 257–271, synonymy, description, distribution, habits, etc.—Dabbene, An. Mus. Buenos Aires, I, 1902, 350, Tierra del Fuego.—Heller, Proc. California Acad. Nat. Sci. (3), Zoöl., III, 1904, 243, Galapagos Archipelago.

Phoca leonina Molina, Sag. Stor. Nat. Chili, 1782, — (not of Linnæus, 1758). Coast of Chili.

Otaria leonina Péron, Voy. aux Terr. Austr., II, 1816, 40, 65.—Desmarest, Nouv. Dict. d'Hist. Nat., XXV, 1817, 590 (in part).—Gray, Zoöl. Voy. Erebus and Terror, Mamm., 1841, 5, pl. xvii, fig. 1, 2, skull, juv.; Cat. Seals in Brit. Mus., 1850, 47; Cat. Seals and Whales, 1866, 59.—Peters, Monatsb. Akad. Berlin, 1866, 264, 665, 670 (referred to as a doubtful species).

? *Eared Seal*, Pennant, Hist. Quad., II, 1793, 278, young. "Streights of Magellan."

? *Phoca flavescens* Shaw, Gen. Zoöl., I, ii, 1800, 260, young. Based on Pennant, as above.

? *Otaria flavescens* Desmarest, Nouv. Dict. d'Hist. Nat., XXV, 1817, 601; Mamm., I, 1820, 252. Based on Shaw and Pennant, as above.—Lesson, Man. de Mamm., 1827, 207; Dict. class. d'Hist. Nat., XIII, 1828, 425. Based on the foregoing.

Sea lion from the island of Tinian by Commodore Byron, Blainville, Journ. de Phys., XCI, Oct., 1820, 287, 419, pl. "Dec., 1820," fig. 3.

P[hoca] byronia? Blainville, *ibid.*, 300. Same as above.

Phoca byronii Desmarest (ex Blainville MS.), Mamm., I, 1820, 240. "Sea lion from the Island of Tinian, by Commodore Byron," in Hunterian Museum, afterwards in Mus. Coll. Surgeons, London. Skull only = *Phoca byronia* Blainville, Oct., 1820.

Macrorhinus byronii Lesson, Man. de Mamm., 1827, 202.

Otaria byronia Peters, Monatsb. k. Akad. Wissen. Berlin, 1866, 269, 666. *Phoca byronia* Blainville. Given as doubtfully distinct from *O. jubata* auct.

"*Otaria byronia* (Blainville)," Burmeister, Zeitsch. für gesammte Naturwiss. Halle, XXXI, 1868, p. 298, in text; referred to *O. jubata* auct.

Ontaria [sic] *molossina* Lesson & Garnot, Férussac's Bull. Sci. Nat., VIII, 1826, 96 (prelim. desc.), Iles Malouines (=Falkland Islands).

Otaria molossina Lesson & Garnot, Voy. Coquille, Zool., I, 1826, 140–149, pl. iii, animal. Detailed description of a young sea-lion, from Falkland Islands.—Philippi, An. Mus. nac. Chile, I, Zool., 1892, 6, 22, pl. ix, animal, pl. x, skull, juv.

Platyrhyncus molossinus Lesson, Man. de Mamm., 1827, 203. Same as above.

Otaria guerin Quoy & Gaimard, Zool. Voy. Uranie, 1824, 71 (footnote). Falkland Islands.

Platyrhyncus uraniæ Lesson, Man. de Mamm., 1827, 204. From Quoy & Gaimard, as above.

Lion marin, Pernetty, Voy. aux Iles Malouines, 1769, 447, pl. viii, fig. 1. Iles Malouines.

Sea Lion, Pernetty, Hist. Voy. to the Malouine (or Falkland) Islands, 2d English ed., London, 1773, 240–242, pl. xvi. Falkland Islands.

Otaria pernettyi Lesson, Dict. class. d'Hist. Nat., XIII, 1828, 421. Based on the Sea Lion of Pernetty, as above.

Sea Lion of Pernetty, Hamilton, Amph. Carn. (Jardine's Nat. Libr.), 1839, 244, pl. xix, animal, from specimens in the Edinburgh Mus.

Otaria chilensis Müller, Arch. f. Naturg., 1841, i, 333, Chili.—Philippi, An. Mus. nac. Chile, I, Zool., 1892, 6, 25, pl. xi, fig. 1, animal, pl. xii, skull, juv., showing part of milk dentition.

Otaria ulloæ Tschudi, Fauna Peruana, Mamm., 1844–46, 136, pl. vi, animal. Coast of Peru.—Peters, Monatsb. k. Akad. zu Berlin, 1866, 270; *ibid.*, 667, 2 pll., skull, ½ nat. size.—Burmeister, Zeitsch. für gesammte Naturwiss. Halle, XXXI, 1868, 298, in text; considered as the female of *Otaria jubata* auct.—Philippi, Mus. nac. Chile, I, Zool., 1892, 12, pl. vi, animal, pll. vii, viii, skull, female.

Otaria hookeri Sclater, P. Z. S., 1866, 80, text fig. of animal. In error; *cf.* Sclater, P. Z. S., 1868, 190.

Otaria godeffroyi Peters, Monatsb. k. Akad. zu Berlin, 1866, 264, 670, pl. i, skull, Chincha Islands, Peru. — Burmeister, Zeits. für gesammte Naturwiss. Halle, XXXI, 1868, 296, 297, in text, referred to *O. jubata* auct.

Otaria minor Gray, Ann. & Mag. Nat. Hist. (4), XIII, April, 1874, 326. Locality unknown (*cf.* Allen, N. Am. Pinn., 1880, p. 201).

Otaria pygmæa Gray, Ann. & Mag. Nat. Hist. (4), XIII, April, 1874, 326. Locality unknown (*cf.* Allen, *l. c. supr.*).

Otaria velutina Philippi, An. Mus. nac. Chile, I, Zool., 1892, 5, 14.

Otaria fulva Philippi, An. Mus. nac. Chile, I, Zool., 1892, 5, 17, pl. ii, animal, pll. iii, iv, v, skull, juv. "Costa de Algarroba y Provincia Bahia de Talcahuana." Specimens described and figured are very young.

Otaria rufa Philippi, An. Mus. nac. Chile, I., Zool., 1892, 6, 28, pl. xiii, fig. I, animal. Length, 990 mm.

EXTERNAL CHARACTERS.[1] — General color of adult light yellowish brown, lighter on the head, darker and more reddish brown on the buttocks and limbs; muzzle and naked membranes of the feet black. Young dark chocolate brown, much darker than the adult, the coloration becoming gradually lighter with age. Females are said to be like the males in coloration.

Length of adult male from muzzle to end of tail about 6 to 7 feet, and from the muzzle to the end of the hind flippers about 8 to 9 feet. Female about one third less in linear measurements.

The old males are described by the early voyagers as maned like a lion, but this is in no strict sense true. The hair is longer on the neck and shoulders than elsewhere, but the maned effect is due mainly to the thick skin being thrown into heavy folds when the head is raised.

SKULL. — The skull of this species has been so often figured and is now so well known that a detailed description is unnecessary. It varies greatly in the two sexes, the male skull being much larger than that of the female, with an excessive development of the processes and crests, as age advances. The average dimensions of old male skulls from the Straits of Magellan are: Total length 350 mm., ranging in a series of 8 old skulls from 325 to 372; zygomatic breadth 223, ranging from 210 to 237. Four old female skulls give an average total length of 260 (252 to 277), and a zygomatic breadth of 143 (140 to 146).[1]

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[1] The material collected by the Princeton Patagonian Expeditions relating to the Pinnipedia not having been conveniently accessible during the preparation of this work I have drawn upon previously published descriptions in dealing with their external and osteological characters. Through the kindness of the authorities of the United States National Museum and the Cambridge Museum of Comparative Zoölogy I have had opportunity to restudy a considerable series of skulls of both the Southern Sea Lion and the Southern Sea Bears, and have utilized to some extent material from my "Monograph of the North American Pinnipeds," published in 1880. I am also indebted to the kindness of Prof. W. B. Scott for Plate XXI, illustrating the skeleton of *Otaria bryonia*, based on a mounted specimen from Patagonia, collected by the Princeton Patagonian Expeditions.

Dr. James Murie[2] and Dr. William Turner[3] have made known the anatomy of this species in great detail, their work being based on Falkland Island specimens.

The Southern Sea Lion bears a strong general similarity externally to the Northern Sea Lion, which it resembles in color and proportions, but, judging from the skulls, it is about one eighth smaller. In cranial characters the two animals are remarkably distinct for members of the same family, not only in dental formula but in the formation of the bony palate. But they appear to agree as closely in habits as in external appearance, both being polygamous, and resorting to particular islands or coasts at a definite season of the year to bring forth their young.

GEOGRAPHICAL DISTRIBUTION.— The Sea Lions of the coasts and islands of southern South America are commonly believed to be referable to a single species, of rather wide distribution. It formerly occurred in great abundance at the Galapagos Islands, and is still found there in small numbers[4]; also along the coasts of Peru and Chili to Cape Horn, resorting especially to some of the islands of this part of the South American coast. It also frequented the eastern coast of Patagonia, and still ranges north to Lobos Island, off the mouth of the Rio de la Plata, and formerly north to the coast of Brazil, off Sta. Catharina[5]. It was formerly numerous at the Falkland Islands and in the Tierra del Fuego Archipelago. It does not appear to have been reported from the South Shetland and South Georgian Islands, nor from any point more remote from the South American coast than the Juan Fernandez and Falkland Islands. In the report on the *Southern Cross* Collections (1902), it is not mentioned as having been met with by the naturalists of this expedition during their long cruise in Antarctic waters.

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[1] *Cf.* Allen, N. Am. Pinnipeds, pp. 226 (footnote), 246, 247; Murie, Trans. Zoöl. Soc. London, 1869, p. 105.

[2] Researches on the Anatomy of the Pinnipedia. Part II. Descriptive Anatomy of the Sea Lion (*Otaria jubata*). By James Murie, M.D., F.L.S., F.G.S., etc. Trans. Zoöl. Soc. London, Vol. VII, pt. viii, Jan., 1872, pp. 527–596, pll. lxvii–lxxiii; Vol. VIII, pt. ix, June, 1874, pp. 501–582, pll. lxxv–lxxxii.

[3] Report on the Seals collected during the Voyage of H. M. S. Challenger in the years 1873–76. Zoöl. Chall. Exp., pt. lxviii, 1887, pp. 1–138, pll. i–x. Appendix to the Report on the Seals. The Myology of the Pinnipedia. By Wm. C. Strettell Miller. *Ibid.*, pp. 139–234.

[4] Heller, Proc. California Acad. Sci. (3), Zoöl., XII, 1904, 244.

[5] Hensel, Abhandl. K. Akad. Wissen. zu Berlin, 1872 (1873), 91.

Respecting their recent occurrence on the eastern coast of Patagonia Mr. Barnum Brown (MSS. notes) says: "Two herds of sea lions were found on the coast of Patagonia at a point about twenty miles south of the mouth of the Santa Cruz River, where they have bred and been noted since the earliest settlements along the southern coast. They occupy two distinct rookeries, although not more than half a mile apart; the herd furthest north, numbering less than 200 head, lives in tide-worn crevices and caverns, from which they slide into the sea with great noise when disturbed. The southern and largest herd has over 300 head, which lives, when ashore, on the open shingle beach under the cliffs. Others were seen off Cape Hall, but they were not in rookeries."

NOMENCLATURE AND TECHNICAL HISTORY.—The early voyagers to high southern latitudes met with Sea Lions, Sea Bears, and Sea Wolves at various points on or near the coast of southern South America and described them in narrations of their voyages, usually in vague terms, but sometimes with sufficient detail to render them recognizable, when the locality is considered, in the light of our present knowledge of the subject. The technical history of the present species may be said to have begun with Pernetty,[1] whose Lion marin, though poorly described and badly figured, observed by him at the Falkland Islands in 1764, is identifiable as this animal, although his account of it is more or less confused with that of the Sea Lion of Anson. Pernetty's Lion marin became, in 1776, in part the basis of Schreber's *Phoca jubata* (*l. c.*), who quotes Pernetty as authority for his statement that the male has long curly hair ("langen krausen Haare") on the nape and neck, like the male lion, and a length of 25 feet and a girth of 19 to 20 feet,[2] and for its occurrence at the Falkland Islands. Schreber also mixes Pernetty's account of its habits with Steller's, although Steller is necessarily his main authority, Pernetty's information is so meagre. As, however, Steller gave no figure of the sea lion, Schreber supplied this deficiency by copying Pernetty's grotesque caricature of the Falkland Island animal. Schreber's *Phoca jubata* was thus composite, though based primarily on Steller.

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[1] Voyage aux Iles Malouines, 1769, p. 447, pl. viii, fig. 1.

[2] It is hard to say whether Pernetty meant this statement to apply to his Lion marin or to Lord Anson's Sea-lion, which Pernetty insists was injudiciously applied to what he calls Loup-marin, his statements are so confused.

For the next fifty years, or till 1828, nearly all systematic writers followed Schreber in considering the northern and southern sea lions as specifically identical. Péron, in 1816,[1] was the first author who had the hardihood to assert that they were specifically distinct, and acting upon this belief he bestowed the name *leonina* upon the southern one and restricted the name *jubata*, very properly, to the northern one, calling them respectively *Otaria leonina* and *Otaria jubata*, without, however, pointing out their distinctive differences. This he doubtless did, or intended to do, in a paper on the Pinnipedia he left in manuscript at his death, in 1810, which was never published. Thus Péron, as the "first reviser," fixed the name *jubata*, as he had a right to do, very appropriately on the *Leo marinus* of Steller.

Unfortunately his name *leonina* for the Falkland Islands species proves untenable, although subsequently employed for it for many years by numerous authors. Its untenability in this connection is due to the fact that Molina, in 1782, gave the name *Phoca leonina* to the same species, as represented on the coast of Chili, notwithstanding the fact that he knew that Linnæus had previously (1758) bestowed the same name (*Phoca leonina*) upon the Sea Elephant (now *Mirounga leonina* auct.).

A large number of specific names have been based, since 1782, on the sea lions of the coasts and islands of southern South America, and from these it is necessary to replace the name *leonina* of Molina and Péron. The first of these, in order of time, is (1) *Phoca flavescens*, given by Shaw in 1800, and founded on the eared seal of Pennant. Pennant's description was based on a young otary in the Leverian Museum, only about two feet in length, said to have come from the Straits of Magellan. It is entirely indeterminable from the description, but the locality, if correctly indicated, leads to the inference that it was more likely a young sea lion than a fur seal; and this being the case, it may be hypothetically referred to the genus *Otaria*, to which it has been provisionally assigned by the majority of writers for the last fifty years; but Gray, in 1871, referred it to *Phocarctos hookeri*.[1] The name *flavescens* evidently rests on a basis too unsatisfactory to warrant its use for any species.

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[1] Voy. aux Terr. Austr., II, 1816, pp. 37–40, *passim*.

In 1820 Blainville[2] described and figured the skull of a sea lion found by him in the Hunterian Museum of London, bearing the legend "Sea Lion from the island of Tinian, by Commodore Byron." His description of this skull is given in considerable detail, and his figure, though rough, aids in determining beyond doubt its reference to the sea lion (*Otaria*) of southern South America. On a later page he bestowed upon it the name *Phoca byronia*. This skull, fortunately, was afterward deposited in the British Museum, and finally transferred to the osteological collection of the Museum of the Royal College of Surgeons, where it is still preserved. It has been examined by numerous competent authorities, as G. Cuvier, Nilsson, Gray, Peters, Burmeister and Flower, who have uniformly referred it to *Otaria jubata* auct. Gray says (Suppl. Cat. Seals and Whales, 1871, p. 13): "I cannot see any difference between the skull in the College of Surgeons, on which *Phoca Byronia* was founded and those [of *Otaria jubata*] in the British Museum." Flower, in his Catalogue of the Osteological Collections of the Museum of the Royal College of Surgeons, enters this skull with the following comment: "This specimen was brought to England in 1769, by Commodore Byron, as is stated, from Tinian, one of the Ladrone Islands, and was for many years preserved in the British Museum. It is not improbable that there has been a mistake as to the locality assigned to it, or that it was brought to the island by some human agency or accident, as living Sea-Lions of this species have never been met with nearer Tinian than the Galapagos Islands. There is no mention of it in Byron's published narrative. De Blainville has given a very incorrect description and figure of this specimen in the 'Journal de Physique,' tome xci., pp. 287 and 300 (1820), under the name of *Phoca byronia*, whence *Phoca byronii*, Desmarest, Mammalogie, p. 240 (1820)."—Flower, *l. c.*, II, p. 189.

As stated by Flower, the skull could not, therefore, as alleged, have come from the Island of Tinian, one of the Mariana or Ladrone Islands (lat. 15° N.), which are situated far outside of the range of any known

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[1] Suppl. Cat. Seals and Whales, 1871, p. 14.

[2] Journ. de Phys., XCI, Oct., 1820, p. 287, fig. 3 of plate dated Dec., 1820; named *Phoca byronia* on p. 300.

Pinniped. The essential facts of the case, then, are: (1) The skull on which the name *Phoca byronia* was based is beyond doubt a skull of the sea lion (*Otaria jubata* auct.) found on the islands and coasts of southern South America; (2) that it is also the first name exclusively based on that animal that is perfectly identifiable and not preoccupied. It is hence necessarily the only available name for this species, which must stand as **Otaria byronia** (Blainville).[1]

Several subsequent names also relate exclusively to this species, which of course become synonyms of *Otaria byronia*. Among these may be mentioned *Otaria molossina* Lesson & Garnot, 1826, based on the Sea Lion of the Falkland Islands, very fully described and well figured in the Zoölogy of the Voyage of the *Coquille*, from a semi-adult male specimen. Other synonyms were added the following year (1827) by Lesson, as *Otaria pernettyi*, based on Pernetty's account of the Falkland Island Sea Lion, and *Platyrhyncus uraniæ*, based on the "Otarie Guérin" of Quoy and Gaimard, — a young or female sea lion, also from the Falkland Islands. In 1841 Müller added *Otaria platyrhinchus*, based on the type of F. Cuvier's genus *Platyrhyncus*, and *Otaria chilensis*, based on specimens obtained by Philippi on the coast of Chili. In 1844 von Tschudi added *Otaria ulloæ* = the female of *Otaria byronia* (=*jubata* auct.) as recognized by Peters, Gray, and Burmeister. Peters in 1866 added *Otaria godeffroyi*, from the Chincha Islands, off the coast of Peru, which he later considered doubtfully distinct from *O. jubata*, and to which it was subsequently referred by Gray and Burmeister as representing the male of that species. Gray, in 1871, described an *Otaria minor* and an *Otaria pygmæa*, both based on skulls from unknown localities, and previously referred by him to *O. jubata*. Finally, Philippi, in 1892, added three more, namely, *Otaria velutina*, *O. fulva* and *O. rufa*, besides reviving *O. molossina* and *O. chilensis* of previous authors, making six species recognized by him from the coast and islands of Chili. His descriptions and figures of most of them are based on very young specimens, some of them still retaining part of the milk dentition.

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[1] Desmarest, the same year (Mamm., I, 1820, p. 240), gave a description of the same skull, under the name *Phoca byronii*, "espèce nouvelle, fondée par M. de Blainville," etc., his account having been evidently based on Blainville's manuscript description. He believed it to be allied to the Sea Elephant, as did Lesson in 1827. Evidently Desmarest's account was written before Blainville's description was published, and in the uncertainty as to which account was actually first published, it is best to consider Blainville as the author of the species and accept his form of the name.

NOTE ON THE NAME OF THE NORTHERN SEA LION.

As already said, *Phoca jubata* Schreber was based primarily on the *Leo marinus* of Steller, the description being almost wholly from Steller, with references to the Sea Lion of Pernetty; and as Steller did not figure the Sea Lion, as he did the Sea Bear, Schreber copied Pernetty's execrable figure of the Sea Lion of the Falkland Islands, supposing, as did subsequent naturalists generally for the next fifty years, that the Northern and Southern Sea Lions were specifically the same. In 1816, as stated above, Péron asserted their specific distinctness, restricted the name *jubata* to the Northern Sea Lion, and gave what he evidently supposed to be a new name, *leonina*, to the Southern Sea Lion, and transferred both from *Phoca* to his new genus *Otaria*. As already explained, the name *Otaria leonina* is untenable on account of Molina's having previously called the same animal *Phoca leonina*, a name preoccupied by Linnæus's *Phoca leonina* for the Sea Elephant.

Lesson in 1862 renamed the Northern Sea Lion *Otaria stelleri*, and the name *stelleri* has since been in almost universal use for this animal. In view of Péron's restriction, twelve years before, of the name *jubata* to this species, the name *stelleri* obviously becomes a synonym of *jubata*, and the correct name of Steller's Sea Lion is **Eumetopias jubata** (Schreber). Unfortunate as it may seem, the history of the case shows the necessity of the change, under the current rules of nomenclature.

EARLY HISTORY OF THE NORTHERN AND SOUTHERN SEA LIONS.

The case of the Northern and Southern Sea Lions, often known respectively as Steller's Sea Lion and Forster's Sea Lion, furnishes an instructive illustration of the struggles of zoölogists in arriving at a fair knowledge of animals long known only from the vague accounts of explorers and travellers, who, while perhaps eminent in other ways, were not good naturalists. The case of the Fur Seals, or Sea Bears, of the northern and southern hemispheres is equally complicated and interesting, but need not be dealt with at length in this connection; it may suffice to say that the history of these groups is perfectly parallel to that of the Sea Lions. Our knowledge of the northern forms dates, in both cases, from Steller (1751), whose classic memoir on these animals forms a conspicuous landmark in the early history of mammalogy. In his "De Bestiis Marinis" both the Sea Lions and the Sea Bears were made known with admirable detail and clearness, and for nearly a century this memoir remained our chief source of information respecting them.

It was, however, quite different with the large Pinnipeds of the southern hemisphere, including the Sea Elephant as well as the Sea Lions and the Sea Bears. They were first made known by the early voyagers to the Southern Seas, as Dampier (1697), Freizer (1717), Anson (1748), Byron (1769), Pernetty (1770), Forster (1777), Cook (1784), Weddell (1825), and others, who gave, however, only very imperfect and erroneous accounts of them; and yet they were taken by systematists many years later as the basis of supposed species, notably by Desmarest (1817 and 1820) and Lesson (1828). Thus each of the South American species was named over and over again by compilers who apparently, in most instances, had never seen a specimen of any of them. The early voyagers appear to have taken home very few specimens, and these were not always correctly labelled as to locality of capture. Thus, as in the case of the Commodore Byron skull, already mentioned, they were sometimes attributed to localities remote from the home of any species of Pinniped, and in other cases it was uncertain whether the specimen came from the vicinity of Cape Horn, or the Cape of Good Hope, or the Australian seas, the locality being finally given as the "Antarctic Seas," or as "unknown." In some cases the specimen consisted of a skin without a skull, sometimes of a very young animal, as in the case of Pennant's Eared Seal and Buffon's Petit Phoque; in other cases of a skull without the skin, sometimes adult, sometimes young. While these animals were being slaughtered on their breeding grounds by sealers, for their skins or oil, by the tens of thousands annually during the latter part of the eighteenth and early part of the nineteenth centuries, and their habits and haunts had become well known, scarcely a specimen reached any of the scientific museums of Europe, or fell under the observation of competent naturalists. It was not apparently till about 1840 that any mammalogist had had specimens of the northern and southern sea lions for comparison, when Müller found skulls of both in the Berlin Museum, and was able to confirm for the first time their specific distinctions by actual comparison of their skulls. In the Paris and London Museums there were a few skulls of the southern species, but none of the northern, until about 1859, when a skull of this animal reached the British Museum, received from California, and was described by Gray as a new species. Neither had he up to that time seen a skull of the northern fur seal.[1]

Till many years after the middle of the nineteenth century no one had opportunity to recognize the great differences due to age and sex that obtain in these animals; and it was therefore not strange that when, some years later, isolated skulls from different localities and of different ages began to arrive at the British, Berlin, and other Museums, they should be taken as the basis of supposed distinct species, with the result of adding to the long array of synonyms that now cumber the literature of the subject. It was not till about 1870 that sufficient material for determining the cranial differences due to age and sex began to accumulate, when good series of skulls and skeletons, as well as of skins, of the northern sea lions and fur seals reached the Museum of Comparative Zoölogy at Cambridge, and the National Museum in Washington, and also of the southern forms as represented at the Galapagos Islands.

Finally, as I stated in 1880:[2] "Of about fifty synonyms pertaining to the Eared Seals, probably two thirds have been based, directly or indirectly, upon differences dependent on sex and age, and the rest upon the defective descriptions of these animals by travellers."

FIGURES.—The Southern Sea Lion has been figured repeatedly, both as regards the skull and the animal. The early figures are naturally crude and of little value; the later ones meet all requirements of detail and accuracy. In the following enumeration the principal illustrations of the animal and its external features are first mentioned, and then those of the skull and its general anatomy.

Animal.—The first published figure of this species is probably that given by Pernetty,[3] in 1769, based on the sea lion of the Falkland Islands. This, though a wretched caricature, was copied by Schreber to illustrate his *Phoca jubata*, and this fact constitutes the chief interest and importance of Pernetty's figure.

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[1] Dr. Gray, in 1864 (P. Z. S., 1864, p. 34) said: "I am not aware that the *Leo marinus* of Steller exists in any Museum." In 1868, he wrote as follows: "When I published my 'Catalogue of the Seals in the British Museum,' in 1850, I was satisfied from Steller's description that the species he described from the Arctic regions were distinct from those found in the southern seas; and when I at last succeeded in obtaining specimens and skulls from the northern regions of the Pacific, I not only found that my idea was confirmed, but that they did not belong to the same genera."—Ann. and Mag. Nat. Hist. (4), I, Feb., 1868, p. 99.

[2] Hist. N. Am. Pinnipeds, 1880, p. 227, footnote.

[3] Voy. aux les Iles Malouines, II, 1769, pl. viii, fig. 1.

In 1782 a fairly good representation was published by Buffon[1] from a drawing made by Forster, also at the Falkland Islands. The species was again illustrated by Lesson and Garnot in 1826,[2] who gave a colored figure of a young animal from the Falkland Islands, under the name *Otaria molossina*. This figure was copied by Hamilton in his "Carnivorous Amphibia." Hamilton gave also in 1839 a poor figure of what he called "The Sea-Lion of Pernetty,"[3] based on a specimen in the Royal Museum of Edinburgh, which, he says, "was brought from the antarctic regions some years ago."

Tschudi in 1844–46,[4] gave a figure of his *Otaria ulloæ*, from a young example about four feet long, from the coast of Peru.

The next figure appears to have been published by Sclater,[5] an excellent representation of a young male in the Garden of the Zoölogical Society of London, "captured on the sea shore near Cape Horn." Other figures from life of the same specimen, according to Gray and Murie, were published in "Land and Water," "The Illustrated London News," and "The Boys' Own Magazine" (VI, No. 33, p. 214). The cut from "Land and Water" was republished by Dr. Murie in his memoir on the Anatomy of *Otaria jubata*,[6] and duly acknowledged. He also gave other text cuts illustrating (fig. 2, *l. c.*, p. 539) its manner of swallowing food; a group (fig. 3, *l. c.*, p. 556) of Sea Lions in a variety of positions on land and in the water, from drawings made from the living animal in the Zoölogical Society's Gardens; and also additional attitudes (fig. 4, *l. c.*, p. 575) assumed, drawn from life. In the plates accompanying Dr. Murie's admirable memoir are given figures of the fore and hind flippers, and of the hinder portion of the body, showing the external genital organs, the ear, eye, muzzle and throat, and the skin ridges on the breast (*l. c.*, VII, pll. lxvii, lxviii and lxix). Beddard, in his memoir "On the Structure of Hooker's Sea Lion" (*Arctocephalus hookeri*),[7] gave a side view of the head, and a front view of the muzzle of *Otaria* "*jubata*," in comparison with views of similar parts in *Arctocephalus antarcticus* and *Zalophus californianus*. These figures are of special interest as showing the short ears and the character of the nose-pad in *Otaria* as compared with those parts in *Phocarctos* and *Arctocephalus*.

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[1] Hist. Nat., Suppl., VI, 1782, pl. xlviii.

[2] Voy. Coquille, Zool., I, 1826, pl. iii.

[3] Amphib. Carn., 1839, pl. xix.

[4] Fauna Peruana, 1844–46, pl. vi.

[5] Proc. Zoöl. Soc. Lond., 1866, p. 8, woodcut, under the name *Otaria hookeri*, by error.

[6] Trans. Zoöl. Soc. Lond., VII, part xvi, Jan., 1872, pp. 527–596, pll. lxvii–lxxiii; *ibid.*, VIII, part xvi, June, 1874, pp. 501–582, pll. lxxv–lxxxii.

[7] Trans. Zoöl. Soc. Lond., XII, pt. x, 1890, pp. 370–374, figs. 2 and 5.

The pictorial history of this animal, as regards its external characters, was further supplemented by Philippi, in 1892, by a series of very inartistic and unimportant figures, based in large part on immature examples from Chili.

Skull and General Anatomy.—The earliest figure of the skull, and one of special importance from a nomenclatural standpoint, was published by Blainville in 1820,[1] since on this skull is based the name *Phoca byronia;* this figure, though rather unsatisfactory, is readily identifiable as that of *O. jubata* auct., as is shown further by his description of it. In addition to this, the skull is still (or was recently) in the Museum of the College of Surgeons of London, and, as already stated (*antea*, p. 112), has been repeatedly examined and identified by competent authorities as belonging to this species. In fig. 4 of the same plate Blainville figures the dentition (side view) of another skull of this species under the name of "Sea lion from islands Falckland." The first skull was erroneously supposed to have come from the Island of Tinian, one of the Mariana group.

The next figure of a skull that seems identifiable with the Southern Sea Lion is that given by G. Cuvier in 1823 in his "Ossemens fossiles,"[2] a side view of a "tête adult du Cap" (*l. c.*, p. 222), which appears to be the same skull as that figured by F. Cuvier in 1824,[3] the side view given by F. Cuvier corresponding with the figure given by G. Cuvier. F. Cuvier's figures *e* and *f* of this skull, particularly fig. 2, *f*, of the ventral surface, leave no doubt of its reference to the southern sea lion. This author, however, does not state the locality or history of either of the skulls figured by him as the types respectively of his "Platyrynque" and "Arctocéphale." As said above, and also earlier in this paper (*antea*, p. 104), there is no doubt of the identity of his type skull of the Platyrhinque with the *Otaria jubata* of modern authors.

Hamilton, in 1839, in the volume of Jardine's "Naturalist's Library" devoted to the "Amphibious Carnivora," gave a rude side view of a skull he attributed to the "Sea-lion of Steller" (p. 232), but which is unquestionably, as is his description of the skull, referable to the southern sea lion. The history of the specimen is not given, and the figure has no special value.

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[1] Journ. de Phys., XCI, 1820, pl. (with the number for December, 1820), fig. 3.

[2] Oss. foss., V, pt. i, 1823, pl. xviii, fig. 4.

[3] Mém. du Mus. d'Hist. Nat., XI, 1824, pl. xv, fig. 2, *d*, *e*, *f*.

In 1840 Blainville figured the skeleton, and also the skull and dentition[1] of a very old male, four views, one third natural size, being given of the skull. The skeleton, it is stated, came from the coast of Chili, as did also the skull, the latter having been obtained by Dr. Néboux on the cruise of the *Vénus*.

In 1844, in the Zoölogy of the *Erebus* and *Terror*,[2] Gray gave two views, profile and from below, of the skull of a young specimen. This is presumably the same skull figured by him ten years later in his "Catalogue of Seals in the British Museum" (p. 46), apparently from the "west coast of South America" (*cf. l. c.*, p. 48), under the name *Otaria leonina*, and again republished in his "Catalogue of Seals and Whales" (1866, p. 58).

In 1866 Peters gave three views of the skull of *Otaria godeffroyi*[3] and also three of a skull of *Otaria ulloæ* Tschudi,[4] both of which species he later referred to *O. jubata* auct.

In 1872–1874 Dr. Murie, in his well-known memoir (*l. c.*) on the "Anatomy of the Sea Lion (*Otaria jubata*)," published an admirable series of illustrations of not only the skull but of the general anatomy, including the soft parts as well as the skeleton. Two wood cuts in the text[5] (VIII, p. 506) give comparative views of the palatal surface of the skull of the male and female, and plates lxxv and lxxvi a series of figures of the skull of a young male, including sectional views. Plate lxxvii illustrates the skeleton and numerous separate bones, and a series of skulls of different ages, from a fortnight old to old adults, in profile and from above, showing "progressive growth." Five additional plates[6] are devoted to the myology, and five others[7] to the brain, sensory, vascular, digestive, urinary, and genital organs.

In 1883, Burmeister, in the Atlas (livr. 2, pl. viii, 17 figures) to his

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[1] Ostéographie, Les Phoques, pll. iii, vi and ix.

[2] Mamm., pl. xvii, figs. 1 and 2.

[3] Monatsb. Akad. Berlin, May, 1866, pl. i.

[4] *Ibid.*, Nov., 1866, pl. i.

[5] First published in Proc. Zoöl. Soc. Lond., 1869, p. 103.

[6] Trans. Zoöl. Soc. Lond., VII, pll. lxix–lxxiii.

[7] *Op. cit.*, VIII, pll. lxxviii–lxxxii.

"Description Physique de la République Argentine," gave a series of figures of skulls of old and young of both sexes, showing individual and sexual variation, and also variation due to age. This is a most important series of figures, based on specimens from the Lobos Islands, off the mouth of the Rio de la Plata.

In 1892 Philippi figured a number of skulls, including those of three supposed new species, all, however, based on very young animals, several of the skulls showing part of the milk dentition, besides other features of immaturity.

Otaria byronia has thus been very fully and satisfactorily illustrated as regards both its external characters and internal structure.

Genus ARCTOCEPHALUS F. Cuvier.

Arctocéphale, F. Cuvier, Mém. du. Mus. d'Hist. Nat., XI, 1824, 205, pl. xv, fig. 1, *a*, *b*, *c*.

Arctocephalus F. Cuvier, Dict. des Sci. Nat., XXXIX, 1826, 554. Same as above. Type, "*Phoca ursina*" = *Phoca antarctica* Thunberg.

Halarctus Gill, Proc. Essex Inst., V, 1866, 7, 11. Type, *Arctocephalus delalandi* Gray = *Phoca antarctica* Thunberg.

Arctophoca Peters, Monatsb. Akad. Berlin, May, 1866, 276 (subgenus of *Otaria*). Type, *Otaria* [*Arctophoca*] *philippii*, sp. nov.

Euotaria Gray, Ann. & Mag. Nat. Hist. (4), IV, Oct., 1869, 269 ("South America"); Suppl. Cat. Seals and Whales, 1871, 20. Type and only species, *Arctocephalus nigrescens* Gray = *Phoca falklandica* Shaw.

Gysophoca Gray, Ann. & Mag. Nat. Hist. (4), IV, Oct., 1869, 269 ("Australia"); Suppl. Cat. Seals and Whales, 1871, 24. First species, *Otaria* (*Arctocephalus*) *cinerea* Peters = ? *Otaria cinerea* Péron, 1816 = *Otaria cinerea* Quoy & Gaim., 1830 = *Otaria forsteri* Lesson, 1828.

The only species referred by F. Cuvier (*l. c.*, 1826) to his genus *Arctocephalus* is his "*Arctocephalus ursinus; Ursus marinus,* Steller, Novi comment. petrop., 11, p. 331," which he elsewhere mentions as "*Phoca ursina,* Linn.," and distinctly says is the type of his genus *Arctocephalus*.[1] On this account many subsequent writers have given the type of *Arctocephalus* as *Phoca ursina*. Under this name, however, Cuvier associated not only Steller's Sea Bear, but the Fur Seal observed by Pernetty at the Falkland Islands, and the Fur Seal of the Cape of Good Hope, (*l. c.*, 1826, p. 554), — in other words, all the fur seals then known. As F. Cuvier figured the type skull of his genus *Arctocephalus*, his figure must determine the type of the genus. Furthermore, it is a well-known fact that no skull of Steller's *Ursus marinus* reached any European museum till many years after Cuvier established his genus *Arctocephalus;* it was thus impossible that this species should have served as the basis of his figure and description of the skull. Besides, his figure does not leave the least doubt as to its being, not this species, but some one of the several southern species of fur seal. Cuvier, himself, does not intimate in either of his two accounts of the genus *Arctocephalus* the source of his specimen. In another work,[1] of about the same date, he describes the dentition of certain of the seals, and says: "J'ai tiré cette description de une tête qui avait appartenu à l'ours marin (*phoca ursina*), et qui avait été rapportée du cap de Bonne-Espérance par M. Lalande"; also his brother G. Cuvier, in 1823,[2] says he had received from M. Delalande "deux squelettes de jeune âge, et une tête adulte de cette espèce" from the Cape; this adult skull he describes and figures (*op. cit.*, pl. xviii, fig. 5). As these were the only skulls of this genus in the Paris museums at the time F. Cuvier established *Arctocephalus*, it must be assumed, aside from the evidence afforded by the figure, that his type was not *Phoca ursina* Linn., but the Fur Seal of the Cape of Good Hope, referred to by F. Cuvier[3] as the "O. [tarie] de Delalande," and later named *Arctocephalus delalandii* by Gray.[4] It had, however, been previously described by Thunberg in 1811 as *Phoca antarctica.*[5] The type of *Arctocephalus* F. Cuvier is thus *Phoca antarctica* Thunberg = *Arctocephalus antarcticus* (Thunb.) Gray.[6]

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[1] Mém. du Mus., XI, 1824, p. 208; Dict. des Sci. Nat., XXXIX, 1826, p. 553.

GENERIC CHARACTERS. — Facial portion of skull slender, elongated, pointed, gently declined. Molars $\frac{6-6}{5-5}=\frac{12}{10}$, large in comparison with those of *Callotaria*.

Arctocephalus is well distinguished from *Callotaria*, the only other genus of Fur Seals, by the slenderness and declivity of the rostral portion of the skull and the much more elongated and relatively narrower general form of the entire skull. The cranial differences between these two groups are, however, not nearly so great as those which separate *Otaria* from *Eumetopias* and *Zalophus*. Dr. Peters, in his last synopsis of the Eared Seals, referred all of the Fur Seals to the genus *Arctocephalus*, and placed all the Hair Seals, except *Otaria byronia*, in the genus *Eumetopias*, thus recognizing only three genera of Otaries — *Otaria*, *Eumetopias* and *Arctocephalus*.

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[1] Des Dents des Mammifères, 1825, p. 123.

[2] Ossem. foss., V, 1823, p. 220.

[3] Dict. de Sci. Nat., XXXIX, 1826, p. 558.

[4] Proc. Zoöl. Soc. Lond., 1859, p. 107, pl. lxix.

[5] Mém. Acad. St. Petersb., III, 1811, 322.

[6] *Arctocephalus antarcticus* Gray, Ann. and Mag. Nat. Hist., 4th Ser., IV, Oct., 1869, p. 266; Suppl. Cat. Seals and Whales, 1871, 17.

The number of species of *Arctocephalus*, as well as their nomenclature, has been a subject much in dispute, owing to lack of sufficient material to determine the status of the supposed species, and to the unsatisfactory basis of many of the earlier names. Peters, in 1877, recognized seven species of southern Fur Seals, but several of them rest on very unsatisfactory evidence. In 1892[1] I considered that six were fairly entitled to recognition; another, *Arctocephalus townsendi* Merriam, had not then been described. They are, adding the latter, as follows:

1. *Arctocephalus townsendi* Merriam. Guadalupe Island, off Lower California.
2. *Arctocephalus philippii* (Peters). Islands of Juan Fernandez and Mas a Fuera, and probably adjacent coast and islands of western South America.
3. *Arctocephalus australis* (Zimm.). Falkland Islands, Straits of Magellan, and probably South Georgian Islands.
4. *Arctocephalus antarcticus* (Thunb.). West coast of South Africa and adjacent islands.
5. *Arctocephalus gazella* (Peters). Kerguelen Island, and St. Paul and Amsterdam Islands, and probably the Crozet Islands.
6. *Arctocephalus forsteri* (Lesson). Coasts of New Zealand, Australia and Tasmania, and the islands to the southward and eastward.

Very little new light has since been thrown upon the subject, as regards the number and exact definition of the species. Facts of considerable importance having an indirect bearing on the matter have been developed through the Fur Seal Investigations of the seal herds in Bering Sea and the North Pacific; it having been established that the several herds which frequent respectively for breeding purposes the Pribilof Islands, the Kurile

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[1] Proc. Fur Seal Arbitration, Vol. II, Appendix to Case of U. S., I, 1892, pp. 373–375.

Islands, and the Commander Islands, have separate feeding as well as breeding grounds, and do not mingle even during migrations; and also that the animals composing these separate herds are so far differentiated in external and other characters as to be considered worthy of recognition in nomenclature under separate names. Thus instead of the northern Fur Seals being all referred as formerly to a single species, they are considered as separable into three closely related species, under the names respectively, of (1) *Callotaria ursina* (Linn.) of Bering Island, the real Sea Bear (*Ursus marinus*) of Steller; (2) *Callotaria alascana* (Jordan & Clark) of the Pribilof Islands; and (3) *Callotaria curilensis* (Jordan & Clark).[1] The differences, so far as known, separating these forms are sufficient to render even their peltries distinguishable. This being the case it is more than probable that the southern Fur Seal herds that congregate at different breeding resorts would also show similar differentiation, if material representing them could be brought together in sufficient amount for satisfactory comparison. It does not, for example, seem probable that the Fur Seals of the Galapagos Archipelago can be strictly the same as those breeding on the Falkland Islands,[2] or even those of Juan Fernandez and Mas a Fuera Islands; or that the herds that formerly resorted in immense numbers to the Shetland, South Georgian and other Antarctic Islands south of Cape Horn may not have presented minor differences from those whose breeding resorts were in much lower latitudes. In the absence of satisfactory material, however, for such comparison the Fur Seals of southern South America and adjacent islands will be treated in the present connection as belonging to two species, under the names *Arctocephalus australis* (Zimm.), of which the type locality is the Falkland Islands, and *Arctocephalus philippii* (Peters), of which the type locality is Juan Fernandez Island. Both species are represented in the material at hand by fifteen skulls, of which four are referable to *A. australis* and eleven to *A. philippii;* ten of the latter are from the Galapagos Archipelago, while one purports to have come from "Straits of Magellan."

The two South American species may be readily recognized by their marked cranial differences, the skull of *A. australis* having the rostral portion very short with short nasals, while the same part in *A. philippii* is relatively greatly lengthened, with correspondingly long nasals. In brief, *A. australis* is a *short-nosed* species and *A. philippii* a *long-nosed* species. These features also involve the whole contour of the skull, so that one is markedly brachycephalic and the other strongly dolichocephalic. The two species are so distinct that they represent two very good subgenera, as recognized by Peters in 1866, *A. philippii* being the type of his subgenus *Arctophoca*.

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[1] Jordan and Clark, Report Fur Seal Investigation, I, 1898, p. 45, and III, 1899, p. 3.

[2] Since this article was prepared, early in 1902, the Galapagos Fur Seal has been separated as *Arctocephalus galapagoensis* by Heller (Proc. Cal. Acad. Sci., 3d Ser., Zoöl., III, 1904, p. 245), but on very unsatisfactory evidence of its distinctness. See further, p. 134.

A very distinct species of this genus, not previously known to exist north of the equator, was described by Dr. Merriam, in 1897, from Guadalupe Island, off the coast of Lower California, from weathered skulls collected by Mr. C. H. Townsend. These skulls, kindly loaned to me for comparison with skulls of *Arctocephalus* from the Straits of Magellan and the Galapagos Archipelago, prove of such interest that it has been deemed desirable to give figures of them for comparison with those of their southern allies, and to republish in this connection Dr. Merriam's original description and historical summary of this nearly extirpated animal, with additional historical matter.

ARCTOCEPHALUS AUSTRALIS (Zimm.).

(Plates XV, Fig. 1; XVI, Fig. 2; XVII, Fig. 2, Skulls.)

Falkland Isle Seal, Pennant, Hist. Quad., II, 1781, 521. Specimen in Mus. Roy. Soc. London, from "Falkland Iles."

Phoca australis Zimmermann, Geogr. Gesch., III, 1782, 276, based on the "Falkland Seal, Pennant, II, 521."

Arctocephalus australis Allen, Hist. N. Am. Pinn., 1880, 193, 210; Fur Seal Arbitr., Appen. Case U. S., I, 1892, 374.—Thomas, P. Z. S., 1881, 4, Straits of Magellan.—Turner, Zoöl. Challenger Exped., pt. lxviii, 1888, 39, 82, pl. vi, figs. 1, 3, 5, pl. vii, parts of skeleton.—Townsend, Rep. Fur Seal Invest., III, 1899, 274, pl. xxxv, Lobos Islands.—Albert, Act. Soc. scient. du Chili, XI, Dec. 1901, 224–257. General history, description, synonymy, habits, Chilian laws for its protection, etc.

Otaria australis Philippi, An. Mus. nac. Chile, I, Zool., 1892, 6, 40, pl. xi, fig. 2, animal, pl. xxi, skull. Punta Arenas, Straits of Magellan.

Phoca falklandica Shaw, Gen. Zoöl., I, pt. ii, 1800, 256. Based on Pennant's "Falkland Isle Seal."—Weddell, Voy. towards the South Pole, 1825, pp. 137–142, account of habits and products, especially in relation to the South Shetland Islands.

Otaria falklandica Desmarest, Dict. d'Hist. Nat., XXV, 1817, 601; Mamm., I, 1820, 252. Based on Pennant and Shaw. — Hamilton, Ann. Nat. Hist., II, Oct., 1838, 81, pl. iv (name *Otaria falklandica* on the plate only); Jardine's Nat. Libr., VI, Amphibia, 1839, 271, pl. xxv (based on two stuffed specimens in Mus. Univ. of Edinburgh, brought from the Falkland Islands by Capt. Weddell). — Peters, Monatsb. K. Akad. Berlin, 1866, 273. — Sclater, P. Z. S., 1868, 528 (Falkland Islands). — Burmeister, Zeitsch. f. gesammte Naturwissens. Halle, XXXI, 1868, 299.

Otaria (*Arctophoca*) *falklandica* Peters, Monatsb. K. Akad. Berlin, 1866, 672.

Arctocephalus falklandicus Gray, List Mamm. Brit. Mus., 1843, 103; Cat. Seals in Brit. Mus., 1850, 42 (in part); Cat. Seals and Whales, 1866, 55; Ann. & Mag. Nat. Hist. (4), I, 1868, 103; Suppl. Cat. Seals and Whales, 1871, 25; "Hand-List of Seals, 1874." — Burmeister, Ann. & Mag. Nat. Hist. (3), XVIII, 1866, 99, pl. ix, fig. 1–4, skull (Buenos Ayres). — Allen, Bull. Mus. Comp. Zoöl., II, 1870, 45. — Cunningham, Nat. Hist. Strait Magellan, 1871, 179, Straits of Magellan. — Burmeister, Descrip. phys. Rép. Argent., III, 1879, 528–530, Atlas, 2^me^ fasc., 1883, pl. x, skulls and teeth, showing variation with age, sex, etc. — Peters, Monatsb. K. Akad. Berlin, 1875, 393–399; 1877, 505–507. — Figueira, An. nac. de Montevideo, II, 1894, 202, islets off Maldonado.

Arctophoca falklandica Peters, Monatsb. K. Akad. Berlin, 1871, 566. — Goeldie (in Nehring), Sitzungsb. Ges. Naturf. Freunde zu Berlin, 1877, 209, near Rio de Janeiro, Brazil.

Arctocephalus ursinus Gray, List. Mamm. Brit. Mus., 1843, 103 — only the Falkland Island reference.

Otarie de Péron, Blainville, Journ. de Phys., XCI., 1820, 295, in part. Skin of a young specimen from Iles Malouines, *apud* G. Cuvier, Ossem. foss., V, 1823, 222.

Otaria hauvillii Lesson, Dict. class. d'Hist. Nat., XIII, 1828, 425. From Cuvier and Blainville, as above.

Otaria shawii Lesson, Dict. class. d'Hist. Nat., XIII, 1828, 425 = *Phoca falklandica* Shaw.

Arctocephalus nigrescens Gray, Zoöl. Erebus and Terror, t. f.—(*cf.* Gray, P. Z. S., 1859, 109, 360 (based on a young skull, from "Falkland Islands?"; Cat. Seals and Whales, 1866, 52 (same specimen); Ann. & Mag. Nat. Hist. (3), XVIII, Sept., 1886, 236 (same specimen, here made type of a subgenus *Euotaria*); Suppl. Cat. Seals and Whales, 1871, 20.

Otaria (*Arctophoca*) *nigrescens* Peters, Monatsb. K. Akad. Berlin, 1866, 669.

"*Otaria nigrescens* (Gray)" Burmeister, Zeits. Naturwissensch. Halle, XXXI, 1868, 198, in text; referred by Burmeister to *A. falklandica* (Shaw).

Arctophoca nigrescens Peters, Monatsb. K. Akad. Berlin, 1871, 564.

Euotaria nigrescens Gray, Ann. & Mag. Nat. His. (4), I, Feb., 1868, 106 (several Falkland Island specimens mentioned); *ibid.*, IV, Oct., 1869, 264 (three skulls from Desolation Island, southwest coast of Patagonia).

Arctocephalus grayii Scott, Mamm. Recent and Extinct, 1873, 19. Avowedly a new name for *Arctocephalus falklandicus* auct.

Euotaria latirostris Gray, Hand-List Seals, 1874, 37, pl. xxvii, skull. Based on a skull supposed to have come from Falkland Islands, previously referred by Gray to his *Arctocephalus nigrescens.*

Arctocephalus (Arctophoca) gracilis Nehring, Arch. f. Naturg., 1887, i, 92, pl. ii (skull, young). Rio Tramandahý, Rio Grande do Sul, Brazil.

? Otaria brachydactyla Philippi, An. Mus. nac. Chile, I, Zool., 1892, 6, 43, pl. xiii, fig. 2, animal, pl. xxii, skull, very young, with the milk dentition; length of animal, 900 mm. Chonos Archipelago.

Arctocephalus falclandicus var. *gracilis* Nehring, Sitzungsb. Ges. Naturf. Freunde zu Berlin, 1877, 142—coast of Rio Grande do Sul, Brazil.

External Characters.—Pelage of two kinds of hair—long, coarse, blackish overhair tipped with gray or yellowish gray, giving a grizzled effect, except on the ventral surface, where the hairs are without gray tips; beneath this is the thick soft brownish underfur, lighter at the tips and darker basally.

In the absence of specimens it is almost impossible to give a satisfactory description of the external characters of the South American Fur Seals. What the external distinctions may be, can be determined only by an examination of a good series of specimens from various localities. In general coloration, ears and foot structure, they do not appear to differ greatly from the northern species, although they must differ markedly (in life) in physiognomy and more or less in the color and texture of the pelage.

Skull.—Skull short and broad, the brain-case subquadrate, the anteorbital region very short, not greatly depressed, the very short nasals only very slightly sloping and the extreme front border slightly raised, giving a marked retroussé effect; zygomatic arches broadly expanded, the palate strongly concave and the posterior nares narrow; sagittal crest slightly developed. The skull as a whole is shorter and broader than in *A. philippii.* The unworn teeth are distinctly tricuspid, there being a distinct, low, pointed cusp at the anterior base of the main cusp, and a similar one on its posterior border. Teeth relatively much smaller than in *A. philippii.*

The following table of comparative measurements (p. 128) of four skulls each of *A. australis* and *A. philippii* serve to illustrate the chief points of cranial difference in the two species.

General History.—The first introduction of the present species into the literature of natural history appears to have been made by Pennant in 1781, in his "History of Quadrupeds" (Vol. II, p. 521), where, under the name "Falkland Isle Seal," he described a young fur seal in the Museum of the Royal Society sent "from the *Falkland isles.*" Although his description is very incomplete, it has always been considered as referable to the Falkland Island Fur Seal. Pennant's account became the following year (1782) the basis of Zimmermann's *Phoca australis.* In 1800 the same description formed the basis of *Phoca falklandica* Shaw, under which name the species was commonly known till 1880, when Zimmermann's long-forgotten earlier name was revived for it.

In 1828 Lesson renamed *Phoca falklandica*, calling it *Otaria shawi*, and also, in the same year, named the "Otarie de Péron" of Blainville, based on another young specimen from the Falkland Islands ("Iles Malouines"), *Otaria hauvillii*, making the third name based on young specimens of the Falkland Island Fur Seal. The two Cuviers and various other writers had previously referred the Southern Fur Seals to *Phoca ursina*, or to some vernacular equivalent, believing they were not specifically different from the Fur Seals of the North, the *Ursus marinus* of Steller.

COMPARATIVE MEASUREMENTS OF THE SKULLS OF *Arctocephalus australis* AND *A. philippii.*

	Arctocephalus australis, Straits of Magellan.				*Arctocephalus philippii.*			
					Strait of Magellan.	Hood Isl., Galapagos.		
	23331 ♂ ad.	U.S.N.M. 36664 ♂ ad.	M. C. Z. 1125 ♂ ad.	M. C. Z. 1126 ♂ ad.	U.S.N.M. 23332 ♂ ad.	U.S.N.M. 23279 ♂ ad.	U.S.N.M. 23281 ♂ ad.	U.S.N.M. 23280 ♂ ad.
Basal length	235	235	233	235	260	260	272	265
Basilar length (of Hensel)	206	211	211	210	230	245	238	238
Length of brain-case	87	85	87	85	103	97	96	99
Length of interorbital region	70	66	65	70	67	71	75	75
Rostral region	75	76	71	70	84	90	88	85
Palatal length	104	98	102	99	108	111	108	113
Foramen magnum to palatal floor	107	113	111	112	125	125	110	125
Incisors to pterygoid hamuli	136	136	134	137	149	150	149	152
Zygomatic breadth	142	148	144	138	135	132	144	143
Mastoid breadth	124	136	130	125	—	112	122	127
Lachrymal breadth	58	57	64	61	67	64	72	66
Postorbital breadth	48	59	65	—	61	60	63	61
Postorbital constriction	27	35	34.5	27	33	26	31	30
Width of rostrum at base of canines	51	52	51	50	48	51	52	50
Width of palate	28	28	32	31	34	28	31	36
Width of posterior nares	17	16	22	17	24	29	28	28
Upper tooth row (pm.^{1}–m^3)	58	57	59	56.5	60	55[1]	67	68
Nasals, length	34	36	34	37	45	50	49	—
Nasals, width ant.	28	30	30	28	25	24	25	—
Nasals, width post.	12	14	18	16	12	14	12	15
Ratio (skull) of breadth to length	60.4	63	61.3	59	52	51	53	54
Ratio of braincase to total length	32.8	31.5	37	31.9	41.3	37	35	37.3
Ratio of rostrum to total length	31.5	32.3	30.5	30	34	34.6	32.4	32

Dr. J. E. Gray, in 1859, based the name *Arctocephalus nigrescens* on a young skull from the Falkland Islands, a "species" he continued to recognize in all his later works and papers on the Eared Seals, but which by other writers has been quite as uniformly referred to *Arctocephalus falklandicus.* In 1874 the same author based the name *Euotaria latirostris* on a skull also supposed to have come from the Falkland Islands, making the third species recognized by him from these islands. In 1873 Mr. A. W. Scott added still another synonym by avowedly renaming, as *Arctocephalus grayi*, the *A. falklandicus* of previous authors. In 1887 Nehring based the name *Arctocephalus gracilis* on skulls of young examples taken on the coast of Rio Grande do Sul; and in 1892, Philippi described and figured a very young specimen, under the name *Otaria brachydactyla*, from the Chonos Archipelago, which may or may not be referable here.

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[1] Only five molars instead of the normal number, six.

The locality is against such a reference. The skull, as figured, shows the milk dentition, and the short nasals, which give it a resemblance to the skull of *A. australis*, may be due to its extreme immaturity. The description and figures are not sufficient for the satisfactory identification of the alleged species.

Although hundreds of thousands, and probably millions, of these animals have been slaughtered for their peltries, no proper or adequately satisfactory account has been given of the external characters of the species, descriptions of which have been almost entirely based on skulls alone, owing to the absence in museums of the skins of this species.

One of the most detailed accounts yet published is that given by Hamilton in the "Annals of Natural History" (Vol. I, Oct. 1838, pp. 81–95, pl. iv, animal), and republished in part in his "Amphibious Carnivora" (Jardine's Naturalists' Library, VI, 1839, pp. 271–279, pl. xxv). Under the title "Observations on the Fur Seal of Commerce," he gave a critical and discriminating review of the literature of the subject, and described "the Fur Seal of Commerce" in considerable detail from two stuffed specimens presented by Captain Weddell to the Museum of the University of Edinburgh, with extracts from Captain Weddell's[1] account of its habits. It is, however, not stated whether the specimens came from the Falkland or South Shetland Islands, though probably from the latter, judging from Weddell's narrative.

The fullest recent account of the Falkland Island Fur Seal is that given by Turner in the "Zoölogy of the Challenger Expedition" (part lxviii, 1888, pp. 39–41). The skull, on the other hand, has been described and figured by Gray (as *Arctocephalus nigrescens* and *Euotaria latirostris*—see bibliographical citations above), and recently by Burmeister and Turner. Burmeister's plate x of the second livraison of the Mammals of the Atlas to his "Description Physique de la République Argentine" (1883) gives a view of the animal, an adult male, with three views of its skull; also three views of the skull of a young animal, and figures of the hyoid apparatus and the bones of the fore and hind feet; but there is no information as to the place of capture of the specimens figured, though presumably they came from Lobos Islands, Uruguay. Turner, in the "Zoölogy of the Challenger Expedition" (*l. c.*, pl. vi), has also figured the skull and other parts of the skeleton (*l. c.*, pl. vii). As, however, Dr. Turner's figures are not altogether satisfactory, the teeth especially having been badly drawn, the accompanying illustrations (Plates XV, Fig. 1; XVI, Fig. 2; XVII, Fig. 2) may not be superfluous.

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[1] Voyage to the South Pole, London, 1825, pp. 137, 140. See also Allen, *l. c.*, pp. 378, 379 where Weddell's account is again quoted.

Geographical Distribution.—This species is unrepresented in the collections of the Princeton Patagonian Expeditions, nor is any very definite reference made to it in Mr. Hatcher's "Narrative." Mr. Barnum Brown, however, observed it off the coast of Tierra del Fuego, and has kindly prepared the following account of his observations. He says (MSS. notes): "Fur Seals were seen in considerable numbers on the south coast of Tierra del Fuego, but they were not observed off the coast of Patagonia. One herd, estimated to contain 1500 head, was seen near Cape Hall, west of the Strait of Le Maire, and two smaller herds were seen south of Lenox Island, having less than 200 individuals each. These seals are poached by a few natives, but owing to the abrupt, rugged rocks they are seldom found on shore and cannot be driven to a killing ground. The Argentine Government sends a gunboat to these waters once a month to keep off poachers."

The species ranges northward along the Patagonian coast to the mouth of the Rio de la Plata, where it has been long known to frequent the small islands off Maldonado. An out-lying colony was also reported by Nehring[1] in 1887 as found on the coast of Rio Grande do Sul, Brazil, at the mouth of the Rio Tramanduhý; and the same year, through Dr. Nehring, Dr. Goeldie[2] made known the capture of specimens at Ponta Negra, in the neighborhood of the city of Rio de Janeiro, Brazil,—doubtless, however, an exceptional occurrence.

The breeding haunts of this species, as is well known, formerly included the Falkland Islands, New Year's Island, Staten Land, Desolation Islands, and other islands and coasts off the southern portion of South America, and probably the more southern South Shetland, South Georgian, and Sandwich groups. They doubtless still resort to most of these localities, but only in small numbers in comparison with their former abundance.

The material used in the present connection consists of a series of skulls in the United States National Museum, from the Strait of Magellan, which are, however, without definite localities.

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[1] Arch. für Naturg., 1877, pt. i, pp. 80–94, pl. ii; Sitzungsb. Gesells. Naturf. Freunde zu Berlin, 1877, p. 142.

[2] Sitzungsb. Gesells. Naturf. Freunde zu Berlin, 1877, p. 207.

ARCTOCEPHALUS PHILIPPII (Peters).

(Plates XV, Fig. 2; XVI, Fig. 1; XVII, Fig. 1, Skulls.)

? *Phoca porcina* Molina, Sag. Stor. Nat. Chile, 1782, 275. Not satisfactorily identifiable, but apparently a Fur Seal.

? *Otaria aurita* Tschudi (ex Humboldt MS.), Fauna Peruana, 1844–46, 137. Based apparently on a very young Fur Seal from San Lorenzo Island, in the Bay of Callao, Peru. — Philippi, An. Mus. nac. Chile, I, Zool., 1892, 47, based on Tschudi as above.

Otaria (*Arctophoca*) *philippii* Peters, Monatsb. Akad. Berlin, 1866, 276, pl. ii, skull. Juan Fernandez Island.

Arctophoca philippii Peters, Monatsb. Akad. Berlin, 1871, 564.

Arctocephalus philippii Peters, Monatsb. Akad. Berlin, 1875, 393–399, 1877, 505–507. — Allen, Fur Seal Arbitr., App. to Case of the U. S., I, 1892, 374. — Townsend, Fur Seal Invest. (Jordan), III, 1899, 272. Galapagos Islands.

Otaria philippii Burmeister, Zeits. für gesammte Naturwissensch. Halle, XXXI, 1868, 299, in text. — Philippi, An. Mus. nac. Chile, I, Zool., 1892, 6, 33, pll. xiv, xv, animal; pll. xvi–xix, skull.

Otaria (*Arctophoca*) *argentata* Philippi, Monatsb. Akad. Berlin, 1871, 560, pll. i, ii, skull, Juan Fernandez Island. Considered by Peters to be the female of *Arctocephalus philippii*, *l. c.*, 1871, 563.

Otaria argentata? Philippi, An. Mus. nac. Chile, I, Zool., 1892, 38, pl. xx, animal.

Otaria leucostoma Philippi, An. Mus. nat. Chile, I, Zool., 1892, 6, 46, pl. xxiii, animal. Mas a Fuera. Young; length 690 mm.

Orctocephalus galapagoensis Heller, Proc. California Acad. Sci. (3), Zoöl., III, 1904, 245–248. Wenman Island, Galapagos Archipelago.

External Characters.[1] — Above blackish gray, more yellowish gray on the head and neck; brownish black below, proximal portion of the limbs rusty brown; lips and chin rusty brown; mustachial bristles in six rows, part wholly black, part wholly white, and part black with the basal portion white. The long overhair rusty brown basally, with rusty yellow tips on the back, head, and neck, and on the ventral surface uniform brownish black or with the tips ferruginous. The thick underfur is ferruginous (rostroth). The hair on the upper part of the neck has a length of 22 mm., on the middle of the back, 18 mm., and on the middle of the belly, 11–12 mm. The thick, smooth-lying short hair on the dorsal surface of the fore limbs extends only to the middle of the hand and basal portion of the phalanges, which are tipped with very small nails. The distribution of the hair on the upper surface of the hind limbs is the same as on the fore limbs. The nail on the outer toe of the foot is small, flat and short; that on the inner toe somewhat longer. The three middle toes have well developed nails. The skin flap at the end of the toes is largest on the outer toes and smaller on the middle toes, being broadest on the outer toe.

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[1] In the absence of specimens, a free translation of Dr. Peters's original description of the external characters is here given. The cranial measurements (p. 128) are taken from skulls from the Galapagos Archipelago.

Total length from the end of the nose to the end of the tail, 1570 mm.; length of the ear 36; length of the tail, 35; length of the palm, 300; length of the sole, 350; length of the membrane on the middle toes, 90–105; length of the skull, 235. (For further cranial measurements see the table under *A. australis*, p. 128.)

The specimen described by Dr. Peters, as summarized above, is a young adult male, as shown by the illustrations of the skull, in which the sagittal crest is only slightly developed. The ear is apparently a little shorter than in *A. australis*, but in other respects there are no very marked external differences between *A. australis* and *A. philippii*.

Skull.—Skull long and narrow, the posterior part much narrower than in *A. australis*, though the skull as a whole is much longer; rostral portion also narrower, longer and much more sloping; nasals about one third longer and much narrower; dentition much heavier, and the accessory cusps generally wholly absent or rudimentary; palate nearly flat, not vaulted as in *A. australis;* sagittal crest strongly developed, reaching a height of 28 mm. in old males and extending forward to the postorbital processes, as in *Zalophus*, and reaching as great a degree of development.

Geographical Distribution.—The type locality of *Arctocephalus philippii* is the Island of Juan Fernandez, off the Coast of Chili. In the material at present available there is a single skull labelled as from the Straits of Magellan, and one from "Patagonia," probably Paraca Bay; all of the other eight skulls are from the Galapagos Archipelago, two being from Jarvis Island and six from Hood Island. It would thus appear that *Artocephalus philippii* ranges from the Straits of Magellan northward along the west coast of South America to the Galapagos Archipelago.

Among their noted resorts, from which hundreds of thousands have been taken by the sealers, are Mas a Fuero and Juan Fernandez Islands, the St. Felix, St. Ambrose, and St. Mary's Islands, and Albemarle and other islands of the Galapagos group.[1] Apparently they formerly bred in large numbers at most of these resorts, where apparently a few are still found. There are also numerous records of their capture at many points on the coast of Chili, at the Chincha Islands, and in the Bay of Callao on the coast of Peru.

General History.—Under the name *Phoca porcina* Molina, in 1782, described an eared seal, but whether it was a species of *Otaria* or an *Arctocephalus* it is impossible to determine. It is so very imperfectly described that it must be considered as undeterminable.

Tschudi, in his "Fauna Peruana" (1844–1846), published under the name "*O[taria] aurita* Humboldt," a drawing and a manuscript description of a young eared seal from the San Lorenzo Island, in the Bay of Callao, communicated to him by Humboldt. There is nothing in the description to show whether it was a hair seal (*Otaria*) or a fur seal (*Arctocephalus*).

The first name unquestionably referable to a fur seal from the west coast of South America is *Otaria philippii* Peters (1866), based on a skin and skull of a young adult male from Juan Fernandez Island, of which he gave a detailed description and excellent figures (natural size) of the skull. At the same time he referred it to a new subgenus *Arctophoca*, on the basis of its having only five teeth in the upper premolar-molar series, and the palate deeply emarginate. Neither of these features was normal; the antepenultimate tooth having fallen out (a partly obliterated alveolus is clearly shown in Peters's figure on the right side, and more than the normal interval on the left side), while the great emargination of the posterior border of the palate is obviously due to imperfect ossification. Both these abnormalities occur with some frequency in various species of the Otariidæ.[2]

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[1] For some account of the slaughter of this species for its skins at Mas a Fuero, Juan Fernandez, and Galapagos Islands see Allen, Rep. Fur Seal Arbitr., App, to Case of United States, Vol. I, 1892, pp. 394–396. Also Townsend (for the Galapagos), Fur Seals and Fur Seal Islands of the N. Pac. Ocean (Jordan), Part III, 1899, p. 273.

[2] Of the six skulls from Hood Island, Galapagos Archipelago, four have the molars $\frac{6-6}{5-5}$ and two have them $\frac{5-5}{5-5}$, in these two instances with no indication that there were ever any more. In another skull there is a supernumerary denticle between the 5th and the 6th teeth on each side.

In 1871 Philippi based the name *Otaria* (*Arctophoca*) *argentata* on a specimen from Juan Fernandez Island which Dr. Peters and subsequent writers generally have considered as representing the female of *A. philippii*. The same author in an article entitled "Las Focas Chilenas" (An. Mus. Chili, 1892, pp. 52, pll. 23) has recognized five or six species of fur seals from the coast and islands of Chili, all apparently referable to those previously known from the Chilian coast. Among these are two, both based on immature specimens, described as new, namely (1) *Otaria brachydactyla*, from the Chonos Archipelago, founded on a suckling pup still retaining the milk dentition, and too immature for determination by the description and figures (see *antea*, p. 126); and (2) *Otaria leucostoma* from Mas a Fuera, of which the skull is not figured. It is apparently a female or a young male of *Arctocephalus philippii*.

In 1904 the Fur Seals of the Galapagos Archipelago were separated by Heller (*l. c.*) as a distinct species under the name *Arctocephalus galapagoensis*, on the basis of certain supposed cranial differences distinguishing it from *A. philippii*. His comparison must have been made with Peters's description and figures of the skull of *A. philippii*, which I had already considered with care in reference to a good series of Galapagos skulls, without feeling myself warranted in making the separation later proposed by Mr. Heller. His alleged characters—"wider skull, both the zygomatic and mastoid measurements being considerably greater, and by longer snout and mandible"—are not evident. While his measurements of an "old adult" male skull are larger than those given by Peters, it must be recalled that the type skull of *A. philippii* was, while "full-grown," "not very old."[1] The differences in size and proportions are only what might be expected in skulls of the same species of corresponding ages. While the Galapagos animal may very naturally be different on geographical grounds, from that of the Juan Fernandez Islands, as already intimated (*antea*, p. 123), any differences that may exist can be shown only by direct comparison of satisfactory material from

A skull from Jarvis Island, Galapagos Archipelago, has six teeth on the left side and only five on the right, set in close juxtaposition.

The emargination of the palatal border, in varying degree, is a not very uncommon condition in Pinnipeds which have normally the palatal border truncate or only slightly concave.

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[1] " . . . dem Schädel eines augsgewachsenen, aber noch nicht sehr alten männlichen Exemplars."—Peters, Monatsb. Akad. Berlin, 1866,p. 276.

the two localities. Until this has been done it seems premature to treat the two forms as specifically different.

ARCTOCEPHALUS TOWNSENDI Merriam.

(Plates XVIII, XIX and XX, Skulls.)

[*Arctocephalus* sp.] Allen, Gill and Merriam, Fur Seal Arbitration, Append. to Case of the United States, I, 1892, 586. Announcement of the discovery of a species of *Arctocephalus* on Guadalupe Island, Lower California.

Arctocephalus sp. nov. Allen, *ibid.*, 373, making the same announcement, with historical comment on the occurrence of Fur Seals off the coast of Mexico, Lower California and southern California.

Arctocephalus townsendi Merriam, Proc. Biol. Soc. Washington, XI, 1897, pp. 175–178, original description.—Townsend, Fur Seals and Fur-Seal Islands N. Pac. Ocean (Jordan), III, 1899, 269–272, habits and statistics of capture.

In the general form the skull of *A. townsendi* is much nearer that of *A. philippii* than that of *A. australis*. In cranial characters *townsendi* differs from *philippii* much as *philippii* does from *australis*, but the distinctive features of *philippii* are carried less far in *townsendi*, and other differences are added. Especially distinctive are: (1) the greater narrowness of the skull, particularly of the rostral portion; (2) the much narrower and more depressed palate; (3) the more flattened audital bullæ; and (4) the somewhat smaller size and slenderer form of the skull. The external differences are not known, *A. townsendi* being thus far known only from more or less imperfect skulls.

I am indebted to Dr. C. Hart Merriam, the describer of the species, for an excellent photograph of the palatal aspect of the type skull (an old male), here reproduced (natural size) in Plate XVIII, and a "young adult" female skull, here figured (natural size) in Plates XIX and XX. A comparison of Plate XVIII (palatal view) with Plate XVII (palatal views, ¾ nat. size) will serve to illustrate some of the striking differences that distinguish *A. townsendi* from both *A. philippii* and *A. australis*. For further descriptive details it is sufficient to transcribe Dr. Merriam's original description, as follows:

"*Type Locality.*—Guadalupe Island, off Lower California. Type No.

83617, ♂ ad., U. S. National Museum. Collected on the beach on west side of Guadalupe, May 22, 1892, by C. H. Townsend.

"*Cranial Characters.*—Contrasted with skulls of *Arctocephalus* (*australis* or *phillipi* [=*philippii*]) from the Galapagos Islands, skulls of *A. townsendi* differ in somewhat smaller size; much shorter rostrum; shorter nasals; larger and more freely open incisive foramina; heavier and shorter ascending branches of premaxillæ, which do not push backward along the nasals as in *australis* [=*philippii*]; smaller, flatter and smoother audital bullæ; *much narrower* and more deeply excavated palate; narrower postpalatal notch; broader and heavier jugals; broader zygomatic processes of maxillæ, which are *expanded to form a broad floor under* the anterior half of the orbit; larger, broader, and more rounded anterior nares in the male, and absence of sagittal crest between frontals.

"The most important characters are the exceedingly narrow and excavated palate, flat audital bullæ, short and thick ascending arm of premaxilla, and broadly expanded zygomatic root of maxilla, forming a floor under the anterior half of the orbit. There are also tooth characters: the first upper molar (5th molariform tooth) is mainly posterior to plane of anterior root of zygoma; both upper true molars are double rooted, and the last upper premolar is incompletely double rooted.

"In the female of *townsendi* the narrow and deeply excavated form of the palate is even more emphasized than in the male, and the postorbital constriction is very much narrower than in the female of *australis* [=*philippii*]."

" MEASUREMENTS OF MALE SKULL OF *Arctocephalus townsendi* (THE TYPE).

" Greatest basal length (gnathion to occipital condyles)	256
Basal length (gnathion to basion)	243
Basilar length of Hensel (basion to incisors)	233
Palatine length (gnathion to postpalatal notch)	120
Postpalatal length (postpalatal notch to basion)	125
Zygomatic breadth	151
Lateral series of teeth (canine to last molar inclusive)	88
Distance between canines	22.5
Distance between 3d pair of molariform teeth	22.5
Breadth (anteroposterior) of zygomatic root of maxilla between inferior lip of antorbital foramen and orbit	21 "

The Guadalupe Island Fur Seal, though now commercially extinct, being reduced to a few individuals, was formerly so abundant as to have formed the basis of a profitable Fur Seal fishery, carried on at intervals for many years, at several groups of islands off the western coast of Mexico and Lower California. The history is so interesting, as well as important, that it may well be here transcribed for convenient future reference.

The first notice of this seal as a distinct and undescribed species is a note written in June, 1892, and signed jointly by Dr. Gill, Dr. Merriam, and the present writer, as given below, and published the same year in the report of the "Fur Seal Arbitration, Appendix to the Case of the United States," Vol. I, p. 586, but not available for public reference till 1895. This note, entitled "The Fur Seal of Guadalupe Island, off Lower California," is as follows:

"For many years it has been known that fur-seals breed at Guadalupe Island, where formerly large numbers were killed annually for their skins. Two thousand were secured as late as 1883, since which time small numbers have been taken nearly every year. Inasmuch as the Northern fur seal (*Callorhinus ursinus*) is not known to breed south of the Pribilof Islands, but occurs in winter off the coast of northern California and passes north in the spring, it seemed important to determine the species of fur-seal inhabiting Guadalupe Island. For this purpose an expedition was sent to said island by the direction of Dr. C. Hart Merriam in May, 1892, in charge of Mr. C. H. Townsend, an assistant of the United States Fish Commission. Seven fur seals were seen near the island and one was shot by Mr. Townsend, but it sank before it could be recovered. The visit was made too early in the season to find the seals on the shore. A beach on Guadalupe Island was visited where it was known that a large number of fur seals had been killed a few years previously and four skulls were there obtained. We have carefully examined these skulls and find them to belong to a species of *Arctocephalus*, a very different kind of fur seal from that found in Bering Sea, the well-known *Callorhinus ursinus*. [Signed]

J. A. ALLEN,
THEO. GILL,
C. HART MERRIAM."

The history of this seal probably runs back to Dampier, who, in 1686, met with seals at the Chametly and Tres Marias Islands, in latitude 23°

and 21° respectively, off the west coast of Mexico. In describing the Chametly Islands he says: "The bays about the Islands are sometimes visited with Seals; and this was the first place where I had seen any of these Animals, on the North side of the Equator, in these Seas." In writing of the Tres Marias Islands he says: "The Sea is also pretty well stored with Fish, and Turtle or Tortoise, and Seal. This is the second place on this Coast where I did see any Seal: and this place helps to confirm what I have observed, that they are seldom seen but where there is plenty of Fish."[1] Whether these seals were the California Sea Lion (*Zalophus californianus*), the California Sea Elephant (*Mirounga angustirostris*), or a Fur Seal, he has left no means of determining.

The early history of their presence on the coast of Lower California and Mexico I have detailed in another connection[2] and here transcribed.

"Formerly large numbers of fur-seals were taken at the San Benito, Cerros (or Cedros), Guadalupe, Santa Barbara, and other islands off the coast of Lower California, and also on the coast of the mainland. Though formerly abundant at all these points, they have become nearly exterminated by the indiscriminate and persistent attacks of the seal hunters.

"Until recently the fur-seals off the Lower California coast were supposed to be the same as the Alaska species, but Dr. Merriam has recently obtained skulls from the old killing grounds on Guadalupe Island which show that it is not only a different, as yet a probably undescribed species, but that it is referable to the genus *Arctocephalus*, not previously known to occur north of the equator. It is resident the whole year off the California coast, and resorts to the caves on the islands it frequents to bring forth its young. In these respects it resembles the fur-seals of the Galapagos Islands, to which it seems to be closely related.

"The following historical notes may be of interest in the present connection:

"In 1825 Capt. Benjamin Morrell cruised along the west coast of Mexico and California in search of fur-seals. Under date of May 20, 1825, he writes that he arrived at Cape Blanco, in latitude 42° 49′ N. 'Between this cape and that of Mendocino, which is in latitude 40° 17′ N. . . . there are many small islands and rocks, some of which lie 3 miles from the main. On these islands or keys I expected to find fur-seals, whereas

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[1] A New Voyage Round the World, 5th ed., Vol. I, 1703, pp. 263, 276.

[2] Fur-seal Arbitration, Appendix to the Case of the United States, I, 1892, 373, 374.

I found them all manned with Russians, standing ready with their rifles to shoot every seal or sea-otter that showed its head above water.' (Morrell, Voyages and Discoveries, p. 212.) Continuing southward, 'perceiving little prospect of taking fur-seals on any part of the coast which the Russians have monopolized,' he reached Socorro Island, in latitude 18° 53′ N. 'At 6 a. m. the boats were despatched to examine the island in search of fur-seals; but returned, after a faithful inspection, without seeing more than twenty animals of that species. They saw about 300 sea-leopards and 1,500 hair-seals.'[1] (*Ibid.*, p. 213.)

"He visited Guadalupe Island earlier in the season (March 27–31), and says: 'We lay here three days, during which time we took a number of fur-seals.' A few days later he visited Cerros Island, and sent out boats to search the island, but neither seals nor sea-elephants were seen. He says: 'There are many fine fish to be caught around this island, and it was formerly a great resort for sea-elephants and fur-seals; but it now appears to be entirely abandoned by these animals.' (*Ibid.*, p. 196.) On April 8 he landed at Cenizas Island, in about latitude 30°, in search of fur-seals, but found only sea-leopards and sea-elephants, about 400 of the former and 800 of the latter. Later (April 23 to May 5) he 'examined the islands of St. Clement, St. Barbara, St. Rosa, and St. Miguel,' for fur-seals, but, he says 'without much success,' although he saw a few sea-elephants and many 'sea-leopards.' On May 11 he arrived at the Farallon Islands, of which he says: 'Many years ago this place was the resort of numerous fur-seal, but the Russians have made such havoc among them that there is scarcely a breed left. On this barren rock we found a Russian family and twenty-three Codiacks, or Northwest Indians, with their bark canoes. They were employed in taking sea-leopards, sea-horses, and sea-elephants for their skins, oil, and flesh, the latter being jerked for the Russian market on the Northwest Coast.' (*Ibid.*, pp. 108, 110.)

"Captain Scammon refers to the former occurrence of fur-seals at San Benito Islands and on the 'coast of California,' where, he says, 'many beaches were found fronting gullies, where [fur] seals in large numbers formerly gathered; and as they had plenty of ground to retreat upon, the sealers sometimes drove them far enough back to make sure of the whole herd, or that portion of them the skins of which were desirable.' (Scammon, Marine Mammalia of the Northwest Coast, pp. 152, 154.) Unfortunately Captain Scammon's account gives no definite dates, but the period referred to must have been prior to the year 1850. He also refers, in Mr. J. Ross Browne's "Resources of the Pacific Slope" (p. 128), to Guadalupe and Cerros Islands as having been formerly favorite resorts of fur-seals and sea-elephants."

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[1] Probably *Zalophus californianus*, which probably still occurs there in small numbers. *Cf.* Nelson, N. Amer. Fauna, No. 14, April 29, 1899, pp. 17, 18.

Dr. Merriam's account of the circumstances that led to the discovery of the species, and his statistical history of Fur Seal hunting within a comparatively recent period at Guadalupe Island,[1] complete the history of a species that nearly reached extinction before its existence had become scientifically known. He says:

"During the recent international discussion respecting the seals of Bering Sea, the matter of the distribution of the Northern Fur-seal (*Callorhinus ursinus*) has received closer attention then heretofore, and questions have arisen as to the southernmost range of the species in the past.

"It had been known for many years that colonies of fur-seals inhabited parts of Guadalupe and the San Benito Islands, off the coast of Lower California, and these seals were commonly assumed to be the northern species—the same that breeds in such numbers at the Pribilof Islands in Bering Sea. But it seemed to me a violation of the known laws of geographic distribution that a species adapted to the arctic climate and cold waters of Bering Sea, and even there requiring constant fogs to protect it from the feeble rays of the sun, should be able to breed under clear skies on the subtropical islands of Guadalupe and San Benito.

"During the sessions of the Bering Sea Joint Commission in February and March, 1902, I made bold to express the opinion that the fur-seal which breeds on these islands would prove to be, not the northern species belonging to the genus *Callorhinus*, but a southern species belonging to the genus *Arctocephalus*. No specimens were at hand for examination, but through the coöperation of the Department of State and Fish Commission I was enabled to send a small boat, in direct charge of Mr. C. H. Townsend, on a special mission to Guadalupe Island.

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[1] A New Fur-Seal or Sea-Bear (*Arctocephalus townsendi*) from Guadalupe Island, off Lower California. By C. Hart Merriam. Proc. Biol. Soc. Washington, Vol. XI, pp. 175–178, July 1, 1897.

"Mr. Townsend sailed from San Diego on May 14, 1892, reached Guadalupe on the 16th, and remained there until the 27th. He saw seven fur seals and shot one, which sank before it could be recovered. The trip was made too early in the season to find the seals on shore. A locality was visited where it was known that a large number had been killed a few years previously, and here four skulls were obtained. These skulls were immediately sent to Washington, and on their arrival, were examined by Dr. J. A. Allen, Dr. Theodore Gill and myself, and proved, as had been suspected, to belong to the genus *Arctocephalus*. A joint note to this effect was published by us in the "Fur Seal Arbitration, Appendix to the Case of the United States," Vol. I, p. 586, 1892. In the same volume (p. 373) Dr. Allen expresses the belief that the skulls in question represent an undescribed species. The northernmost locality from which the genus had been previously recorded is the Galapagos Islands under the equator, about 2,500 miles southeast of Guadalupe.

"In his manuscript report on the Guadalupe trip Mr. Townsend states: 'Guadalupe Island is thoroughly volcanic and there are caves by the dozen along every mile of the shoreline which were once the retreats of thousands of fur seals. On the afternoon of May 17 we saw four seals swimming some distance off shore. Two of these we believed to be fur seals, but could not get within shooting distance, although we tried for an hour. The other two, seen later, were undoubtedly *Zalophus*. No seals whatever were found on the rocks. . . . On May 22 we examined SW Point and the three islands or rocks south of it. On the most southerly rock we found a band of *Zalophus*, about thirty in number, hauled out. There was no fur seals among them. Passing the point, we continued, pulling in the dory, the schooner lying to off shore, up the west side of the island about eight miles, where we anchored. In the evening we visited the spot where Borges and Sisson had killed two or three hundred fur seals about ten years before. Only a few weather-worn skulls were found, which we gathered for shipment to Washington. The next day, May 23, we hunted along shore, in the boat as usual, as far as the next point south of NW Point about six miles, the schooner keeping well off shore. At 10 A.M., near the outlying rocks off this point, we found what seemed to be a male fur seal, perhaps about four years old, asleep on the water with his fins held aloft in the manner so characteristic of these animals. I got a pretty fair shot with the rifle but missed. Half an hour later I shot a female fur seal, killing it instantly. Before we could get the hook on it, it sank below our reach, although only three boat-lengths away when shot. The water was perfectly clear and we could see the animal sinking when we reached the bloody spot on the water. It began to sink *immediately* when shot. With an extra long hook we might have reached it. We remained in the neighborhood for an hour, but no more seals were seen. While lying to with the vessel about two miles off this point the Captain saw two fur seals from the vessel, but was powerless to try getting them. It was on the rocks at this point that Capt. Hunt had killed a pup fur seal the year before (1891).'

"In addition to his own observations Mr. Townsend collected from California sealers some very important information respecting the abundance of the Guadalupe fur-seal and the numbers killed in recent years. This may be summed up as follows:

"In 1880 Capt. Geo. W. Chase, of San Diego, made several trips to Guadalupe for fur-seals, which he found 'tightly packed in the caves and holes [in the rocks].' He generally fired at their eyes in the darkness of these places, but sometimes used candles. His skins sold for $15 each, from which he made $2,200 in 1880. The same man (Capt. Chase) stated that about a year earlier a Mr. Borges sold his catch of Guadalupe sealskins at San Francisco for over $20,000 (the rate being $10 to $15 per skin).

"In 1883 Capt. Geo. E. Wentworth killed about 2,000 fur-seals on Guadalupe. Captain Wentworth states that several other vessels were there at the same time, and that the Guadalupe fur-seal was practically [commercially] exterminated that year—1883.

"In 1890 Capt. Nelson told Mr. Townsend that he had killed fur-seals with more or less regularity every year on the exposed shingle beach at the northwest end of Guadalupe Island, where he pursued them into the caves and killed them with clubs.

"In 1891 Geo. M. Hunt, of San Diego, visited Guadalupe in December for the purpose of sealing and killed 5 fur-seals—4 adults on the east side and one pup on the northwest side. A few others were seen off shore."

In a paper published by Mr. Townsend in 1899,[1] he gives (*l. c.*, p. 272) in detail the information above summarized by Dr. Merriam, and adds, on the authority of Mr. A. W. Anthony, a well known naturalist, that 36 fur-seals were taken at Guadalupe in 1893, and 15 in 1894. He gives also statistics for the years 1876 to 1894, and adds: "This incomplete record accounts for 5,557 fur-seals killed at Guadalupe between 1876 and 1894."

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[1] Pelagic Sealing with Notes on the Fur Seals of Guadalupe, the Galapagos, and Lobos Islands. By Charles H. Townsend, U. S. Fish Commission. The Fur Seals and Fur-Seal Islands of the North Pacific Ocean (Jordan), Part III, 1899, pp. 223–274, pll. xxii–xxxv.

Family *MUSTELIDÆ*.

This family, so far as known, is represented in Patagonia by only three genera, a Skunk (*Conepatus humboldti*), the Weasel-like *Lyncodon patagonicus*, and two species of Otter (*Lutra*). Two other species, the Tayra (*Tayra barbara*, or a form of it), and the Grison or Huron (*Galictis vittata*) nearly reach our borders, the former occurring, according to Burmeister, as far south as the Grand Chaco in Argentina, and sparingly in Paraguay, and the latter as far south as the northern part of Patagonia. The true Weasels (genus *Putorius*) occur in northern South America, and as far south as Peru in the Andes, but are absent from the more south-eastern parts of the continent.

Genus CONEPATUS Gray.

Conepatus Gray, Charlesworth's Mag. Nat. Hist., I, Nov. 1837, 581. Type, and only species, *Conepatus humboldti* Gray, sp. nov. — Howell, N. Amer. Fauna, No. 20, 1901, 20 (footnote). — Thomas, Ann. & Mag. Nat. Hist. (7), VIII, Dec. 1901, 528 (in text).

Thiosmus Lichtenstein, Abhandl. Akad. Wissen. Berlin, 1836 (1838), phys. Kl., 270. No type = *Conepatus* + *Marputius* Gray, 1837.

The genus *Conepatus*, taken in the broad sense for the bare-nosed skunks in general, ranges from the southern border of the United States southward to the Straits of Magellan. The group proves, however, divisible into three subgenera — *Conepatus* (s. s.), *Marputius* Gray,[1] and *Oryctogale* Merriam.[2] The latter includes most of the bare-nosed skunks of the United States and Mexico; *Marputius* includes certain Mexican, Central American and South American species, leaving *Conepatus* restricted apparently to the Patagonian and allied species of southern South America. The geographical limits of these several groups, however, have not been worked out, and the material now available does not permit me to throw much light on the subject. As shown by Thomas (*l. c.*) in opposition to a suggestion by Howell (*l. c.*), the name *Thiosomus* is not available for use in this connection, being antedated by both *Conepatus* and *Marputius* of Gray, in whatever sense *Thiosmus* may be construed.

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[1] Type, *Mephitis chilensis* (= "*Mephitis chilensis* Geoff. Inhabits Chili. Brit. Museum." According to Thomas (Ann. & Mag. Nat. Hist. (7), VIII, Dec. 1901, 528), the "type was what Gray called '*Mephitis chilensis* Geoff.'; but his specimen (B. M. 68*a*) proves to be not the Chilian Skunk (*Conepatus chinga*, Mol.), but the Brazilian one and the actual type of Lichtenstein's *Mephitis amazonica*."

[2] Type, *Conepatus leuconotus* (Licht.) from Vera Cruz, Mexico. *Cf.* Merriam, Proc. Biol. Soc. Washington, XV, p. 161, Aug. 6, 1902.

CONEPATUS HUMBOLDTI Gray.

(Plate XXII, Skulls.)

Conepatus humboldti Gray, Charlesworth's Mag. Nat. Hist., I, Nov., 1837, 581. Straits of Magellan.—Milne-Edwards, Miss. du Cap Horn, VI, Zool., 1890, 6–14, pl. i (animal), pl. vii (skull).—Merriam, Proc. Biol. Soc. Wash., XV, 165, Aug. 6, 1902 (in text).—Prichard, Through Heart of Patagonia, 1902, 260.

Conepatus nasutus, var. 2. *humboldti* Gray, P. Z. S., 1865, 146. "Hab. Magellan Straits."

Conepatus nasutus, var. 3. *chilensis*, Gray, P. Z. S., 1865, 146, in part; not *Marputius chilensis* Gray, 1837.

Mephitis patagonica Lichtenstein, Abhl. Akad. Wiss. Berlin, 1836 (1838), 275, Patagonia = *Conepatus humboldti* Gray.—Cunningham, Nat. Hist. Strait Magellan, 1871, 109. Sandy Point, Patagonia.

Conepatus castaneus Gervais & D'Orbigny, Voy. Amer. Mérid., Mamm., 1850, 19, pl. xii.

Adult Female (winter).—General color above reddish brown with two longitudinal stripes of white as follows: Two bands of white, united on the head into a transverse band in front of the ears, pass, one on either side, from the head to the base of the tail; between these a median band of chestnut, extending from the crown onto the basal fifth of the tail; this band is dark chestnut on the nape and shoulders, then light yellowish chestnut to the hips, and again darker on the lower back, rump, and base of tail; sides of the body dark chestnut brown; ventral surface still darker, blackish brown, darkening to black on the anal region and base of the tail; fore and hind limbs blackish brown; ears small, heavily clothed, blackish brown like the head; tail rather short but very broad, basally chestnut above and blackish below, then grizzled white and blackish above, with a broad, ill-defined subterminal band of blackish and tipped with white; below with two indistinct bands of black; claws white, fore claws very long.

This is a very old female, as shown by the skull. Two younger specimens are similar, except that the dark median dorsal band is blackish brown instead of chestnut, and the sides, underparts, and limbs are also much darker, almost black. A third somewhat older specimen is rather lighter, with a faint tinge of chestnut on the median band and sides. It would thus appear that the general color lightens with age, and that the light brown tints characterize more particularly old adults, which sometimes have the median band light chestnut and the upper portions of the sides of the body chestnut brown.

The tail, in all of the specimens, is composed of two kinds of hair, as respects length and color—long hairs wholly white, and shorter hairs with the apical portion black, which latter form the subapical black band of the tail, beyond which the tips of the wholly white hairs project for about 30 to 35 mm., forming a broad terminal white fringe. In the old specimen, described above in detail, there are two broad black bands in the tail, a subapical and a subbasal, both distinctly visible on the lower surface of the tail, but only the outer one well defined on the upper surface. A close examination shows that both bands, while quite regular and well defined as seen from below, are composed of hairs that are white basally and black apically, those forming the proximal band being only about half the length of those which constitute the subapical band. They are probably a new set of hairs, growing out to replace the longer ones.

Measurements.—Old female (No. 99270, U. S. Nat. Mus., Rio Gallegos, Jan. 18): Total length, 570 mm.; tail vertebræ, 200; hind foot, 56; longest fore claw, 18; lateral tail hairs, 140–150. Milne-Edwards gives the length of the type of *Conepatus castaneus* as: Head and body, 360; tail 180 (= total length, 540); hind foot 50; and of his Santa Cruz specimen as: Head and body, 410; tail, 110 (= total length, 520); hind foot, 60.

Skull: Total length, 64; basal length, 60; zygomatic breadth, 42.4; mastoid breadth, 34.3; postorbital constriction, 17; palatal length, 25.3; post-palatal length, 29; length of nasals, 20; width of nasals at middle, 6; upper premolar-molar series, 15.4; m^3, transverse, 8; antero-posterior, 6.5; lower jaw, length, 41.5; height at coronoid, 21; lower premolar-molar series, 20. In this skull the teeth are very much worn, but there is no sagittal crest.

Another skull, sex unknown, from Santa Cruz, slightly older, but without any sagittal crest, measures as follows: Total length, 66; zygomatic breadth, 42; mastoid breadth, 35.5; postorbital constriction, 17.5; upper premolar-molar series, 17; lower jaw, length, 42, height at coronoid, 21; lower premolar-molar series, 22.

Milne-Edwards gives the principal dimensions of the skulls of his Santa Cruz specimens (No. 1), and of the three (Nos. 2–4) obtained by D'Orbigny, respectively as follows: Total length, No. 1, 68; No. 2, 62; No. 3, 65; No. 4, 58; mastoid breadth, No. 1, 38; No. 2, 32; No. 3, 32; No. 4, 33. Only one of the four skulls has a sagittal crest; this is No. 2, in which it extends as a thin lamina of bone 22 mm. in extent.

Represented by four specimens, collected by Colburn, as follows: Rio Gallegos, 2 females, one very old, the other about one fourth grown, Jan. 18, 1898; Basalt Cañons, 50 miles southeast of Lake Buenos Aires, a young female, about one half grown, April 7; Swan Lake, a female, about two thirds grown, March 5. Also a skull, collected by Mr. Brown near Santa Cruz. As already noted, the young are much darker than the adults, but the pattern of markings is closely similar in all.

This species seems to vary considerably in color individually among adults, the specimen described and figured by Milne-Edwards, collected by Mr. Lebrun near Santa Cruz, Patagonia, being much lighter in color than Mr. Colburn's specimen taken near the mouth of the Rio Gallegos, especially on the head and apical portion of the tail; while this author states that those collected by D'Orbigny and described by Gervais have all the dark portions of the body, including the ventral surface and the feet, light chestnut.

According to Mr. Brown (MSS. notes) this animal is now quite rare in southern Patagonia, though abundant at the time of its early settlement; "a few years ago, they were destroyed by some contagious disease." He says "the Indians make beautiful capas or blankets from their skins"; and adds: "I came across one of these animals one day eating an ostrich and tried to drive it away; very much to my surprise, instead of taking advantage of his natural means of defence, the little fellow bared his teeth and came after me, whereupon I beat a retreat."

Of this species Mr. Prichard says: "The Skunk is to be met with throughout the whole country, but we saw perhaps more specimens of this animal in the neighborhood of Bahia Camerones than elsewhere. I have observed it within ten miles of the foot of the Cordillera. The skins are much prized by the Indians for the making of *capas*" (*l. c.*, p. 260).

Genus LYNCODON Gervais.

Lyncodon Gervais, Dict. univ. d'Hist. Nat., IV, 1849, 685. Type, *Lyncodon patagonicus*, sp. nov.

This monotypic genus is most nearly related to *Grison* Oken[1] (= *Galictis* Bell et auct.) and *Tayra* Oken[2] (*Galera* Gray ex Brown), but is quite distinct from either, differing in its reduced dentition, and externally by its very short tail and peculiar pattern of coloration.

LYNCODON PATAGONICUS Gervais.

Lyncodon patagonicus Gervais, Dict. Univer. d'Hist. Nat., IV, 1849, 685; Hist. Nat. des Mamm., II, 1855, 115, fig. (dentition). — Burmeister, Descrip. phys. Rép. Arg., III, 1879, 161. — Matschie, Sitzungsb. Ges. naturf. Freunde Berlin, 1895, 171–177.

Mustela (*Putorius*) *brasiliensis* D'Orbigny, Voy. de l'Amér. Mérid., IV, Mamm., 20, pl. xiii, fig. 3 (skull).

Putois du Chili (*Mustela brasiliensis* on plate) Blainville, Ostéog., Gen. Mustela, 42, pl. xiii (dentition).

Mustela quiqui Burmeister (*nec* Molina) Reise durch die La Plata Staaten, II, 1861, 408.

General color grizzled gray brown, the hairs at base fulvous, subapically broadly ringed with dark brown and terminating in a long white tip; nape blackish brown; head yellowish white, from which extends posteriorly on either side a broad whitish stripe from the side of the head to the shoulder; throat, breast and limbs dark brown like the nape; rest of the lower surface paler brown varied with gray; tail like the dorsal surface, bushy-haired; ears very small, yellowish white, concealed by the surrounding pelage.

Measurements (approximate from flat skin). — Total length, 335 mm.; tail vertebræ, 65. Burmeister gives the total length as 15 inches (380 mm.)

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[1] *Grison* Oken, Lehrb. der Zool., II, 1816, pp. xi and 1000. Type, *Viverra vittata* Schreber. *Cf.* Allen, Bull. Am. Mus. Nat. Hist., XVI, 1902, p. 377.

[2] *Tayra* Oken, Lehrb. der Zool., II, 1816, p. 1001. Type, *Mustela barbara* Linn. *Cf.* Allen, Bull. Am. Mus. Nat. Hist., XVI, 1902, p. 377.

and the length of the tail as 3.50 inches (89 mm.). Gervais describes the size of the animal as between that of an Ermine and a Mink.

Represented by a single imperfect flat skin, without skull or flesh measurements, obtained by Mr. Hatcher on the Rio Santa Cruz in the spring of 1899.

The species was first characterized by Gervais, in 1849, from a single skull obtained by D'Orbigny on the Rio Negro, which heretofore seems to have formed the most southern known limit of its range. Later its external characters were made known by Burmeister, from two specimens, one of which came from Azul, Argentina, near the northern boundary of Patagonia, and the other from the Rio Negro. It is said to have the savage ferocity characteristic of all the weasel tribe, and, according to Burmeister, is sometimes kept in the houses of the ranchmen to destroy rats.

Genus LUTRA Brisson.

Lutra Brisson, Règ. Anim., ed. 2, 1762, 13, 201.—Erxleben, Syst. Reg. Anim., 1777, 445.—Merriam, Science, N. S., I, No. 14, 376, April 5, 1895; type fixed as *Mustela lutra* Linn.

Two species of Otter are said to be found along the southern coast of Patagonia and in the Straits of Magellan region, namely, *Lutra felina* (Molina) and *L. paranensis* Rengger. No specimens, however, were secured by the Princeton University Patagonian Expeditions, and no Patagonian specimens are at present available for examination. Both species are fairly well known, having been repeatedly described, and their skulls at least figured.

LUTRA FELINA (Molina).

Mustela felina Molina, Sagg. Stor. Nat. Chile, 1782, 342; Comp. Hist. Geogr. Nat. y Civil de Chile, 1788, 320.

Lutra felina Shaw, Gen. Zoöl., I, pt. 11, 1800, 448.—Thomas, P. Z. S., 1881, 3 (Straits of Magellan, in part only); *ibid.*, 1889, 198 (critical).

Nutria felina Gray, P. Z. S., 1865, 128; Cat. Carniv. Br. Mus., 1869, 106.

Mustela (*Lutra*) *chilensis* Kerr, An. King., 1792, 172 (= *Lutra felina* Mol.).

Lutra chilensis Bennett, P. Z. S., 1832, 1.—Waterhouse, Zoöl. Voy. Beagle, Mamm., 1839, 23, Chonos Archipelago.—Wagner, Suppl. Schreber's Säug., II, 1842, 260.—Cunningham, Nat. Hist. Strait Magellan, 1871, 344, 350, 482.—Milne-Edwards, Miss. scient. du

Cap Horn, VI, Mamm., 1890, 14, description of animal and distribution.—Dabbene, An. Mus. nac. de Buenos Aires (3), I, 1902, 349, distribution.

Lutra californica Gray, Charlesworth's Mag. Nat. Hist., I, Nov., 1837, 580; List Mamm. Br. Mus., 1843, 71. Locality, "California," probably = Patagonia (*cf.* Thomas, P. Z. S., 1889, p. 198).

Lutra peruviensis Gervais, Voy. la Bonite, Zool., I, 1841, 15, Atlas, pl. iii, figs. 4–6, skull. "San Lorenzo du Pirou."

Lutra brachydactyla Wagner, Suppl. Schreber's Säug., II, 1842, 261, footnote. Provisional name for a specimen "aus West-Amerika."

The above citations refer to the small otter common off the coast of Chili and southward to the Straits of Magellan and the Tierra del Fuego Archipelago. During the voyage of the *Beagle* Darwin met with it in abundance and has left us the best account we have of its habits. He says:

"These animals are exceedingly common amongst the innumerable channels and bays, which form the Chonos Archipelago. They may generally be seen quietly swimming, with their heads just out of water, amidst the great entangled beds of kelp, which abound on this coast. They burrow in the ground, within the forest, just above the rocky shore, and I was told, that they sometimes roam about the woods. This otter does not, by any means, live exclusively on fish. One was shot whilst running to its hole with a large volute-shell in its mouth; another (I believe the same species) was seen in Tierra del Fuego devouring a cuttle fish. But in the Chonos Archipelago, perhaps the chief food of this animal, as well as of the immense herds of great seals, and flocks of terns and cormorants, is a red colored crab (belonging to the family Macrouri) of the size of a prawn, which swims near the surface in such dense bodies, that the water appears of a red color. This specimen weighed nine pounds and a half." (Darwin, Zoöl. Voy. Beagle, Mamm., p. 24.)

Milne-Edwards (*l. c.*, pp. 14, 15) speaks of them as very abundant in the region of Magellan Straits. He states that the officers of the *Romanch* observed them in Orange Bay, at Grévy Island, Banner Cove, and Staaten Land, and specimens were taken in Sea Gull Bay, north of Wollaston. Their skins are commonly used by the Fuegians for clothing, and a short account is given of their manner of hunting the otters.

Mr. Hatcher, in his "Narrative" (p. 247), in his account of the Channel Indians, refers to them incidentally as being hunted by these Indians, from the skins of which and of fur seals they make their scanty clothing. Mr. Barnum Brown met with them along the southern shore of Tierra del Fuego, and has kindly furnished the following from his MSS. Notes:

"Otters are numerous on the islands south of Tierra del Fuego and in Beagle and Darwin Channels. The Channel Indians spear them and sell their pelts to traders for a mere pittance. One canoe stopped our schooner and an Indian brought on board seven pelts which the captain secured for a gallon of aguardiente and a small bag of ship's biscuit."

LUTRA PARANENSIS Rengger.

Lutra paranensis Rengger, Naturg. Saeug. von Paraguay, 1830, 128–138. Paraguay.—Wagner, Suppl. Schreber's Säug., II, 1842, 261 (based on Rengger).—Burmeister, Reise durch La Plata Staaten, II, 1861, 410; Descrip. phys. Répub. Argen., III, 1879, 166.—Nehring, Sitzungsb. Ges. naturf. Freunde Berlin, 1886, 146. Rio Grande do Sul.—Thomas, P. Z. S., 1889, 199, in text, and footnote to p. 198. Straits of Magellan.

Lutra platensis Waterhouse, Zoöl. Voy. Beagle, Mamm., 1839, 21, pl. xxxv, figs. 4*a*–4*c*, skull.—Wagner, Suppl. Schreber's Säug., II, 1842, 262 (ex Waterhouse).—Thomas, P. Z. S., 1889, 199, in text.

?*Lutra solitaria* Wagner, Arch. f. Naturg., 1842, i, 358. Ypenema, Brazil.—Thomas, P. Z. S., 1889, 199, in text.

Lutra felina Thomas, P. Z. S., 1881, 3 (in part only; *cf. ibid.*, 1889, 198, footnote).

Lutra paraguensis Gray, P. Z. S., 1865, 128; Cat. Carniv. Brit. Mus., 1869, 107 (in error for *L. paranensis* Rengger).

Lutra latifrons Nehring, Sitzungsb. Ges. naturf. Freunde Berlin, 1887, 23, in text; in part only.

Lutra paranensis was described in 1830 by Rengger from Paraguay, who refers to it as common along the larger rivers, as the Parana and Paraguay. Waterhouse, in the "Zoölogy of the Voyage of the Beagle" (*l. c.*), redescribed it as *Lutra platensis*, from a specimen killed near Maldonado, near the mouth of the estuary of the La Plata. Burmeister, in his "Description physique de la République Argentine" (III, p. 167), says it is common along the banks of the Rio Parana, Rio Dulce, and Rio

Salado, as well as in the lakes that border them; and is also found further south along the rivers of the Provinces of Buenos Aires and the Banda Orientale, sometimes as far as the mouths of the rivers, near where they enter the ocean. The only record I know for its occurrence in the Straits of Magellan is that by Thomas (P. Z. S., 1889, p. 198, footnote, and p. 199, in text), who states that one of Dr. Coppinger's specimens taken in the Straits of Magellan, and first referred to *L. felina*, proved on a later examination of the skull to be really *L. paranensis*. Its range thus meets that of *L. felina*, and hence occurs on the coast and in the rivers of Southern Patagonia.

Family *CANIDÆ*.

The South American Canids are more or less unlike typical representatives of either *Canis*[1] (*C. lupus* group=*Lupus* Frisch, 1775) or *Vulpes*, and various names have been proposed for their generic or subgeneric designation. For the twenty species and subspecies which seem more or less well entitled to recognition at least five generic or subgeneric names (excluding synonyms) have been proposed. Of these *Speothos* Lund (1839=*Icticyon* Lund, 1843, *apud* Thomas) is widely different from any other member of the family, and was formerly referred by some authors to the Mustelidæ; it includes the "Bush Dog" (*S. venaticus*) of Brazil, and one or more extinct cave forms from the same region.

Another very distinct group is that to which Matthew and Wortman intended to apply the name *Nothocyon*, but which, through the peculiar circumstances attending the original publication of the name, is not available in this connection. The type of *Nothocyon*[2] was intended to be

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[1] By the process of elimination *Canis* Linn., 1758, is restricted to *C. familiaris*, the first of the seven species given by Linnæus under *Canis*. These species are:

1. *familiaris*, type of *Canis*, s. s., Ham. Smith, 1840; Gray, 1868.
2. *lupus*, type of *Lupus* Frisch, 1775; also of Oken, 1816, Gray, 1868, etc.
3. *hyæna*, type of *Hyæna* Brisson, 1762.
4. *vulpes*, type of *Vulpes* Frisch, 1775, and of several later authors.
5. *alopex*,= *C. vulpes* Linn.
6. *lagopus*, type of *Alopex* Kaup, 1829, and of *Leucocyon* Gray, 1868.
7. *aureus*, type of *Thos* Oken, 1816; *Vulpicanis* Blainville, 1837; *Sacalius* Ham. Smith, 1839; *Oxygoüs* Hodgson, 1841; ? *Lupulus* Gervais (ex Blainville), 1855.

[2] *Nothocyon* was first proposed by Matthew (Bull. Am. Mus. Nat. Hist., XII, pp. 20, 62, March 31, 1899) without characterization (*l. c.*, p. 20), although later in the same paper (*l. c.*, p. 62) three fossil species, previously described by Cope, from the John Day (Lower Miocene)

Canis urostictus Mivart, as Dr. Matthew informs me, but as first published it did not include this species, it covering only three previously published fossil species from the Miocene of Oregon, which were later only provisionally referred to this genus, and which prove to be, as would be expected, not congeneric with *Canis urostictus* of Brazil. In allusion to this embroilment I propose for this group, should it be deemed worthy of recognition, the name **Eunothocyon,** with *Canis sladeni* Thomas as the type.[1] Here also belongs *Canis parvidens* Mivart,[2] which, like *C. urostictus*, was described as from "Brazil," without definite locality.

The "Maned Wolf" of southern Brazil, Paraguay and northern Argentina is the type and only known representative of Hamilton Smith's "section" *Chrysocyon* (*Chrysocyon jubatus* = *Canis jubatus* Desm.).

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beds of Oregon were referred to it. The genus was first described nearly three months later (June 21, 1899) in a paper by Wortman and Matthew (*op. cit.*, p. 124) as "*Nothocyon*, gen. nov.," with *Canis urostictus* Mivart, as (inferentially from the context) the type, to which genus were also referred *Canis parvidens* Mivart and also "provisionally the three John Day species [*Galecynus*] *latidens* Cope, [*G*] *lemur* Cope, and *Canis geismarianus* Cope." Hay, however, in his "Bibliography and Catalogue of the Fossil Vertebrata of North America" (1902, p. 771), in entering this genus, says: "No type was designated, but *Canis geismarianus* may be taken.". Palmer, two years later, in his "Index Generum Mammalium" (1904, p. 462), cites Hay, and says "type fixed" (*i. e.*, by Hay, as above). This, according to current rules of nomenclature and current usage, was a perfectly correct proceeding, although when the genus *Nothocyon* was defined it was founded on a skull of a living species from southern Brazil (Am. Mus. Osteol. Coll. Mamm., No. 391, from Chapada, Matto Grosso, Brazil = *Canis sladeni* Thomas, April, 1904), identified and figured as Mivart's *Canis urostictus*. Thus the real intention of the authors was inadvertently defeated by the original publication of the name without any reference being made to the intended type. The point is covered by Canon XXII of the A. O. U. Code, which is: "In no case should the name of a genus be transferred to a group containing none of the species originally included in the genus." There is also a similar provision in most other modern codes of nomenclature.

[1] As stated in the preceding footnote, the real basis of the diagnosis of *Nothocyon* was a skull from Chapada, Matto Grosso, which for this purpose was described in detail and figured, and identified as *Canis urostictus* Mivart. Three years later Thomas described (P. Z. S., 1903, II, p. 235, pl. xxvii, April 1, 1904) a small species, based on Chapada specimens, as *Canis sladeni*, of which the skull used as the basis of *Nothocyon* is unquestionably a topotype. The type of *Eunothocyon* is therefore *Canis sladeni* Thomas. The group will apparently include, besides *E. sladeni* (Thomas), *E. urostictus* (Mivart), *E. parvidens* (Mivart), and perhaps other small forms described and figured by Burmeister under apparently preoccupied names, as noted in the next footnote.

[2] Mivart considers, and probably correctly, that the *Canis vetulus* of Burmeister is not the *Canis vetulus* of Lund, leaving Burmeister's *C. vetulus* without a name, but which he provisionally refers to his *parvidens*, as he does also *Canis fulvicaudus* Burmeister (not Lund).

The "Antarctic Wolf," or "Falkland Island Dog," a species restricted to the Falkland Islands and apparently approaching extinction, is the only recognizable species of Hamilton Smith's "section" *Dusicyon* (emended to *Dasicyon* by most later writers who have referred to it); although named by Shaw, in 1800, as *Canis antarcticus*, it was first really made known by Waterhouse and Darwin (Zoöl. Voy. Beagle, Mamm., 1839, pp. 7–10, pl. iv, animal); its skull, described by Mivart (Mon. Canidæ, 1890, pp. 26–29, pl. viii, animal) in 1890, appears not to have been figured, and its claims to subgeneric distinction are not clear.

The "Azara Fox," the "Magellanic Dog," and their allies fall into Hamilton Smith's "section" *Cerdocyon* (= *Lycalopex* Burmeister, 1854, part), and seem at least subgenerically distinct from the foregoing and from the larger, broader-headed Canids of Guiana, Venezuela and Colombia. For the latter J. E. Gray proposed, in 1868, the genus *Thous*, which has been adopted as a subgenus by several later writers. This name, however, is untenable in this connection, having been applied exclusively by its proposer, Hamilton Smith, in 1839, to certain African and other species of Jackal (type, *Canis anthus* F. Cuv.). *Thous* of Gray includes the "Crab-eating Dog" (*Canis cancrivorus* Desm.) and its allies of northeastern South America, and in the absence of any synonym to replace *Thous* the group may be called **Carcinocyon** with *Canis thous*[1] Linn. (= *Canis cancrivorus* Desm.) as type, to comprise the *C. thous* group, *C. aquilus* Bangs, and probably other forms, including *Canis* **sclateri**[2] (nom. nov.).

The two species of Canids known certainly to occur in southern Patagonia belong to *Cerdocyon*, as recorded below. *C. magellanicus* is a well-marked species, quite distinct from any of its northern allies. The relation of *C. griseus* to the *C. azaræ* group is evidently close, but in the absence of specimens from Paraguay, the type region of *C. azaræ*, and of Uruguay specimens representing *C. entrerianus* (Burmeister), or of *C. vetulus* (Lund) from Minas Geraës, Brazil, it is impracticable to attempt to express an opinion as to their relationships. They are evidently closely allied, and may probably rank, with *C. griseus*, as only more or less well-marked subspecies of *C. azaræ*. All are apparently quite different from the much smaller and otherwise peculiar *Canis sladeni* Thomas from Chapada, Matto Grosso.

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[1] Mr. Oldfield Thomas has recently adopted (Ann. & Mag. Nat. Hist. (7), XII, Oct., 1903, p. 460, and footnote), the Linnæan name *Canis thous* (ex Guiana) in place of *cancrivorus* Desm., on seemingly reasonable grounds.

[2] *Canis microtis* Sclater, 1882, not *Canis microtus* Reichenbach, 1834, = *Canis velox* Say.

Genus CERDOCYON Ham. Smith.

Cerdocyon Ham. Smith, Jardine's Nat. Libr., IX, 1839, 259, 291. Includes *Canis azaræ* Wied, 1826 (= *Canis brasiliensis* Schinz, 1821), *Vulpes magellanicus* Gray, and two unidentifiable species.

Lycalopex Burmeister, Thiere Bras., 1854, 95, part, as a subgenus of *Canis;* includes *Canis azaræ* Wied, *C. vetulus* Lund, *C. cancrivorus* Desm.; *C. magellanicus* Gray; Erläut. Faun. Bras., 1856, 24, 31; includes *C. cancrivorus* Desm., *C. vetulus* Lund, *C. fulvicaudus* Lund.

Lycalopex Gray, P. Z. S., 1868, 511, as a full genus, to include *L. vetulus* Lund, and *C. fulvicaudus* Lund. *C. cancrivorus* is removed as the type of Gray's *Thous*, gen. nov., nec Ham. Smith, 1839.

Pseudalopex Burmeister, Erläut. Faun. Bras., 1856, 24, 44, includes *Canis azaræ* (Wied), *C. griseus* Gray, *C. magellanicus* Gray.

Pseudalopex Gray, P. Z. S., 1858, 512 = *P. azaræ* (Wied), *P. griseus* (Gray), *P. magellanicus* (Gray), *P. antarcticus* (Shaw), *P. gracilis* (Burm.).

Cercodocyon was proposed by Hamilton Smith in 1839, as a "section" of his "subgenus" *Chaon*, for a group of species he called "Aguara Foxes," of which he recognized four species—(1) *Cerdocyon mesoleucus* sp. nov., (2) *Cerdocyon guaraxa*, sp. nov., (3) *Cerdocyon azaræ* (Wied), and (4) *Cerdocyon magellanicus* (Gray). The first was described from a living specimen said to have come from South America; "it forms," he says, "a kind of counterpart to *Thous mesomelas* of the Cape [of Good Hope], and might be mistaken for it." The specimen does not appear to have been preserved, and the species has not been since identified. The second species was described from one of the "original drawings of Prince John Maurice of Nassau-Siegen," and is also unidentifiable. This leaves within the genus two identifiable species, namely *Canis azaræ* Wied and *Vulpes magellanicus* Gray, both well known, and commonly recognized as congeneric.

Lycalopex, originally proposed by Burmeister as a subgenus of *Canis*, in 1854, contained *Canis azaræ* Wied and *C. vetulus* Lund, to which he also referred, in a footnote, *Canis cancrivorus* Desm. and *C. magellanicus* Gray. In 1856 he removed *Canis azaræ* and *C. magellanicus* to his new subgenus, *Pseudalopex*, leaving in *Lycalopex*, of the species originally referred to it, *C. cancrivorus* and *C. vetulus.* To *Pseudalopex* he also referred *C. griseus* Gray, making *Pseudalopex* a pure synonym of *Cerdocyon*, as is also *Pseudalopex* of Gray, excluding *C. antarcticus.*

Gray, in 1868, still further restricted *Lycalopex* by removing from it *C. cancrivorus*, to form, as already stated, his new genus *Thous*, the name for which being preoccupied is above replaced by *Carcinocyon.* Of the four species originally included in *Lycalopex* two (*azaræ* and *magellanicus*) already belonged to *Cerdocyon*, and the removal of *cancrivorus* to *Thous* left in it *C. vetulus* of both Lund and Burmeister. If *C. vetulus* Burmeister is not the *C. vetulus* Lund,[1] as Mivart believed, but is referable to what Mivart saw fit to name *C. parvidens*, *C. vetulus* Burmeister was really nameless, and *Lycalopex* cannot thus take the place of *Eunothocyon.* On the other hand, *Lycalopex* cannot be made to replace *Thous*, when Gray, in establishing *Thous*, preserved *Lycalopex* for what he regarded as another and distinct genus, to include the *C. vetulus* and *C. fulvicaudus* of Lund.

CERDOCYON GRISEUS (Gray).

(Plate XXIII, Skull.)

Canis griseus Gray, P. Z. S., 1836 (1837), 88, nomen nudum.

Vulpes griseus Gray, Charlesworth's Mag. Nat. Hist., I, Nov. 1837, 578. Straits of Magellan; type examined.

Canis griseus Burmeister, Erläut. Fauna Bras., 1856, 48, pl. xxv, animal, xxviii, fig. 3, xxix, fig. 4, skull. Sand Point, Straits of Magellan; Reise durch die La Plata-Staaten, II, 1861, 400; Desc. phys. Répub. Argent., III, 1879, 151, same specimen.—Prichard, Through Heart of Patagonia, 1902, 120, 258, 259 (habits and distribution).

Canis patagonicus Philippi, Arch. f. Naturg., 1866, i, 116. Straits of Magellan.

Canis azaræ Mivart, Mon. Canidæ, 1890, p. 66, pl. xvii, animal, from "type," figs. 25–27, skull, type of *Canis fulvipes* Martin (in part; only Patagonian references).—Hatcher, Narrative Princeton Univ. Patagonian Exped., I, 1903, 58, 68, 167 (habits and distribution).—Also of various other writers, in part.

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[1] *Canis vetulus* Lund has been sometimes referred to *C. azaræ* Wied (= *C. brasiliensis* Schinz) and also to *C. gracilis* Burm. In either case it falls into the group *Cerdocyon* Ham. Smith.

External Characters.—General color above gray, varied with black, most strongly over the median dorsal area, where in some specimens there is a tendency to an ill-defined blackish median band. The pelage is long and heavy, and consists of long rather stiff over-hair and an abundance of soft woolly underfur. Top and sides of nose as far as the eyes, crown, nape, and outer surface of ears rufescent brown; forehead and sides of head more grayish, the hairs being conspicuously tipped with whitish; dorsal region gray, strongly varied with black and strongly suffused with rufous, beneath the surface the hair and fur being dusky for the basal third, then strongly yellowish rufous to the tips of the fur, the projecting points of the stiff over-hair broadly ringed with white and tipped with black; sides paler and grayer, with paler underfur and less black at the tips of the hairs; chin dusky; anal region fulvus; rest of lower surface dull yellowish gray with a whitish median band extending more or less regularly from the throat to the base of the tail; underfur dark gray basally, passing into pale yellowish gray apically, with a patch of darker underfur behind the fore limbs and just in front of the thighs; fore limbs light yellowish rufous on the anterior and inner surface and deep rufous on the posterior and outer surface; hind limbs pale fulvous anteriorly, deep dark rufous posteriorly; tail large and full, the underfur whitish gray at the base, gradually passing into dark sooty gray apically, the portion of the over-hair extending beyond the underfur yellowish gray tipped with black, giving a more or less blackish superficial tint throughout, with the whole tip of the tail black for nearly two inches; also a large well-defined spot of black near the base on the upper surface; ears externally dark cinnamon brown, the edges and inner surface pale fulvous.

Young.—The nursing pups in first pelage are clothed in a soft woolly coat, which over the whole dorsal area is dingy gray basally, darker subapically, and fulvous gray on the surface with scattered long dusky-tipped over-hair; the whole top of the head and limbs strongly reddish fulvous or pale rufous, the nose and the ears externally darker or dull brownish rufous, the edges and inner surface of the ears conspicuously whitish. Below the coloration is similar to that of the adults, as is, in fact, the general pattern of coloration, including the dusky chin and dusky plumbeous axillary patches. The extreme tip of the tail is also blackish.

Measurements.—Fourteen adults, of which 11 are males and 3 are females, taken by Mr. O. A. Peterson and measured by him in the flesh, give the following dimensions (in millimeters):

EXTERNAL MEASUREMENTS OF *Cerdocyon griseus.*

U. S. N. M. No.	Sex.	Locality.	Date.	Total Length.	Tail Verteb.	Hind Foot.
92144	♂	Rio Gallegos	May 28, 1896	2692	343	140
92145	♂	"	" 26, "	2692	368	140
92146	♂	"	" 28, "	2616	305	133
92148	♂	"	June 10, "	2642	330	140
92149	♂	"	May 28, "	2667	330	140
92150	♂	"	" 18, "	2591	305	127
92153	♂	Cape Fairweather	July 14, "	2692	330	140
92154	♂	"	" 2, "	2667	330	152
92155	♂	"	" 7, "	2642	305	127
92156	♂	"	" 7, "	2692	305	127
92157	♂	"	June 30, "	2692	356	147
92147	♀	Rio Gallegos	May 24, "	2565	279	114
92151	♀	"	" 18, "	2565	267	127
92152	♀	"	June 10, "	2616	318	127
		Average of 11 ♂♂		2664	329	137.5
		" " 3 ♀♀		2582	288	123

Skull.—The skull is slender and fox-like, with the rostral portion long and narrow. In old skulls of both sexes the occipital crest is well developed across the central portion of the skull and there is a very short sagittal crest. The dental armature is rather weak and delicate. There are two well developed posterior cusps on $pm_{\overline{4}}$, one on $pm_{\overline{3}}$, with a slight indication of a second, and none or only a slight trace of one on $pm_{\overline{2}}$. In much worn teeth these all nearly or quite disappear through wear, except the last posterior cusp of $pm_{\overline{4}}$. $M^{\underline{2}}$ is large, about half the size of $m^{\underline{1}}$.

Seven fully adult skulls give the following measurements:

MEASUREMENTS OF SKULLS OF *Cerdocyon griseus.*

Nat. Mus. No.	Sex.	Total Length.	Basal Length.	Zygom. Breadth.	Postpal. Length.	Palatal Length.	Upper Molar Series.	Length $M^{\underline{1}}$.
92150	♂	125	121	62.5	51	61	47	12.2
92146	♂	124	121.4	61	50.5	61	47	13
92197	♂	129	120	62	50.3	61.5	50	13
92177	♂	129	124	68	52	65	48.6	14
92176	♀	130	127	66.5	56	63	50	12.5
92152	♀	130	125	66.5	54	62	49.6	14
10081[1]	♀	133	126	64	53	64	50	14.2

[1] Am. Mus. Nat. Hist.

The three specimens sexed as female by the collector (Mr. O. A. Peterson) are the largest of the series, and average a little older than the males, although all are fully adult. There is apparently little if any sexual difference in size.

This species is represented by 16 adult specimens, of which 11 are males, 3 females, and 2 without indication of sex; 11 were taken on the Rio Gallegos, May 18 to June 10, and 5 at Fairweather, June 30 to July 14. Besides these is a series of 6 young pups, representing two litters, taken respectively Nov. 16 and Nov. 29, on the Rio Coy. The 3 specimens taken on Nov. 29 are apparently several days younger than those taken Nov. 16, and also somewhat darker.

The adults vary considerably in color, especially in respect to the amount of black in the dorsal surface, and in the intensity of the fulvous and rufous tints on the limbs. One specimen (No. 92148, ♂, Rio Gallegos) differs from all the others in the very strong fulvous tinge of the whole dorsal pelage. The July (Cape Fairweather) specimens are in rather fresher, less worn coat than the May specimens, and have the whitish gray tips of the over-hair more conspicuous.

The color of the ventral surface is quite variable; in general there is a tendency to a narrow white median band extending from the throat to the tail, broadening on the throat and upper breast, and again on the posterior part of the abdomen, these two areas being connected by a narrower and somewhat irregular band. The amount and purity of the white on the ventral surface varies, and is sometimes wholly replaced by pale fulvous, without any very distinct median band. The plumbeous lateral patches, behind the fore limbs and in front of the thighs, also vary in distinctness, being sometimes strongly developed and again nearly obsolete.

Nursing pups, even of the same litter, show considerable variation in respect to the amount of fulvous suffusion, the dorsal area varying from dull dingy gray to rather strong fulvous gray.

The small gray foxes of Patagonia were referred by Mivart to *Canis azaræ* Wied,[1] under which name he "lumped" a large number of the smaller South American foxes. Other writers, notably Burmeister, have identified the animal from southern Patagonia with Gray's *Canis griseus*, which Gray's brief description very satisfactorily characterizes. Besides this, I have directly compared some of the Patagonian specimens with Gray's type (55–12–24–239)[1] in the British Museum and find there is no question of their identity with *C. griseus*.

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[1] The proper name of this species is *Canis brasiliensis* Schinz (Thierreich, I, 1821, 220), which antedates *azaræ* of Wied by five years (*cf.* Allen, Proc. Biol. Soc. Wash., XIV, 1901, 184).

The following field notes, by Messrs. Hatcher and Brown, give much new and interesting information respecting the habits and distribution of this attractive animal. Mr. Brown's notes have not been heretofore published; Mr. Hatcher's are from his recently published "Narrative" of the Princeton University Patagonian Expeditions. Mr. Brown says:

"Next to the guanaco the small fox, *Canis azaræ*, is most numerous of the larger mammals, ranging from the Straits of Magellan northward. I have seen them throughout Patagonia to 46° N., although they are most numerous near settlements in the southern part, where they feed on dead sheep and young lambs. Owing to their small size and lack of ferocity they never attack grown sheep.

"They burrow under the calafata and incensce bushes and live under the rocks along the rivers and sea coast, where it is not uncommon to see a litter of five or six young ones.

"The stealthiness with which they creep into a camp and attempt to satisfy their insatiable curiosity is wonderful, and however small a piece of tanned leather they may find it is packed off and chewed into small fragments. When journeying over the pampas it is necessary to cover saddle, bridle, harness and boots with canvass or put them out of reach of these prowlers.

"They are very fond of ostrich eggs, and as the shell is too hard for them to break with their teeth the method employed in breaking the shell is ingenious. An egg is pushed with the nose till it rolls down a bank, and if, in striking a rock, it breaks, the fox has a feast. I have seen several nests of eggs scattered at the foot of an incline, some broken by rolling against stones, and although I did not see the operation, it is vouched for by many different persons." (Barnum Brown, MSS. notes.)

At Cape Fairweather, says Mr. Hatcher: "The many cracks and crevices in the surface of the landslide were frequented by a host of small rodents, while the beautiful little gray fox or wild dog, *Canis azaræ*, was also plentiful here, as everywhere throughout the Patagonian plains.

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[1] The type is a young female skin with the skull inside, with milk dentition. It was formerly mounted and has thus become somewhat faded by exposure to light as an exhibition specimen.

This little carnivore, while commonly called a fox, belongs more properly to the lupine or thoöid series of Canidæ than to the vulpine or alopecoid series. Not only is its structure wolf-like rather than fox-like, but its habits are also decidedly more similar to those of the wolves than of the foxes. It is both nocturnal and diurnal, not at all shy and easily approached. These animals are of an extremely playful and mischievous disposition, but without any of the cunning which, by common consent, has been ascribed to the foxes. At times their actions and deportment are not unlike those of a half-grown shepherd dog. They are extremely fond of rawhide or leather, and when by any chance articles made of either were left about camp within their reach for any length of time, such articles were sure to be found in an entirely ruined condition. This necessitated our placing everything beyond their reach when not in actual use. On one occasion I loaned my saddle and bridle and the borrower, on returning them in the evening, was not careful to place the latter in a safe place. As a consequence when I next wanted to use it, I found only the bit and buckles; the reins and headpieces, which were made of California red leather, were cut up into bits each not more than an inch in length. The damage wrought by these little animals would seem to be due to an inherent spirit for wanton and mischievous destruction rather than a search for food. It was never safe to picket a horse with a rope made of rawhide or a long tie strap made of leather, since either might be found cut to bits by these animals.

"They live in shallow burrows, among bushes and in the crevices of the rocks, where such are to be found. They seem to be chiefly scavengers, living for the most part upon the carcasses of dead sheep, guanaco, and other animals. They undoubtedly prey on smaller mammals and on the eggs and young of birds, when the latter are in season. Their fur is abundant, of a soft quality and rather light gray color over most of the body." (Hatcher, *l. c.*, pp. 68, 69.)

The following from Mr. Prichard's "Through the Heart of Patagonia" (pp. 258, 259) interestingly supplements the foregoing from Brown and Hatcher:

"To the east of the Andes, the pampa fox is to be met with practically everywhere. There are two varieties of foxes upon the pampa. The common pampa variety is a most inveterate thief, and causes endless trouble to travellers by eating all and anything that the wind may blow down from the bushes, upon which one's belongings are generally hung by way of guarding against their depredations. If a horse is *sogaed* out with a *cabresto* of hide, the foxes will very often gnaw through the *cabresto* and set the horse free. This trick has cost the life of more than one Gaucho, who, travelling alone upon the pampa, in some district hundreds of miles away from human habitations, has been left quite helpless without his horse, unable to use his *bolas* with effect on foot, and so has starved to death.

"In my experience the range of the grey fox seems to cease at the foothills of the Cordillera, where the Magellan wolf (*Canis magellanicus*) is to be found. Of course, in making this statement I am open to correction. I can merely state that, during the time I spent at Lake Buenos Aires and Lake Argentino, I never saw a pampa fox, although evidences of their presence in the way of tracks were frequent, upon the north shore of the former lake. Yet directly one ascended the range of the hills towards the River Fenix, pampa foxes were to be seen. On the top of Mount Frias I saw a pampa fox in the snow. I never came upon the pampa fox in the forests which grow upon the slopes of the Cordillera.

"The fearlessness of the grey pampa fox is remarkable, even in districts where it is chased by the Indians and their dogs. The pelts are much used for making *capas* or fur cloaks. During the early part of January, 1901, upon the pampa outside the Cordillera, we continually came upon half-grown pampa foxes in twos and threes. Until they saw the dogs they never took to flight."

CERDOCYON MAGELLANICUS (Gray).

Canis magellanicus Gray, P. Z. S., 1836 (1837), 88, nomen nudum.—Burmeister, Desc. phys. Rép. Argent., III, 1879, 146 (in part).—Mivart, Mon. Canidæ, 1890, 52, fig. 21 (skull), pl. xiv (animal, type).—Milne-Edwards, Miss. Scient. du Cap Horn, VI, Zool., Mamm., 1890, 5. Orange Bay, Tierra del Fuego.—Prichard, Through Heart of Patagonia, 1902, 244–246 (colored plate of animal), 259, 260 (habits, distribution, measurements).

Vulpes magellanicus Gray, Charlesworth's Mag. Nat. Hist., I, Nov., 1837, 578. Fort Famine, Straits of Magellan.—Waterhouse, Zoöl. Beagle, Mamm., 1839, 10, pl. v, animal, Chile. (In part only—not the plate, which is based on a Chilian specimen.)—Cassin, U. S. Expl. Exped. (Wilkes), Mamm. and Orn., 1858, 22. Tierra del Fuego.

Cerdocyon magellanicus Ham. Smith, Jardine's Nat. Libr., IX, 1839, 266, pl. xxx. Based primarily on Gray as above.

Canis (*Pseudalopex*) *magellanicus* Burmeister, Erläut. Fauna Bras., 1856, 51, pl. xxvi, fig. 3, skull, Punta Arenas, Patagonia.

Pseudalopex magellanicus Gray, P. Z. S., 1868, 512; Cat. Carn. Mamm., 1869, 199.

Canis montanus Prichard, Through Heart of Patagonia, 1902, 260. A provisional name for a supposed red variety of *Canis magellanicus*. Not *Canis montanus* Marsh, 1871.

EXTERNAL CHARACTERS. — Much larger than *Cerdocyon griseus*, and much more strikingly colored. Head pale rufous, varied with gray and black-tipped hairs, the latter more abundant on the face and upper part of cheeks than elsewhere; back gray strongly varied with black, which is the prevailing tint over the median region from the shoulders to the tail; underfur fulvous gray; sides more fulvous, and less varied with black-tipped hairs, passing into strong fulvous or light rufous on the sides of the neck and lower part of sides; chin dusky; ventral surface yellowish white, passing into pure white on lower part of abdomen; ears externally deep rufous with a slight admixture of black-tipped hairs over the apical portion, internally yellowish white; fore limbs bright rufous externally, fulvous internally; thighs deep rufous red, paler rufous on the legs externally and fulvous internally; upper surface of tail strongly black on the basal fourth, and for three or four inches at the tip and for six or eight inches on the sides; middle portion pale fulvous with an abundance of black-tipped hairs; lower surface pale rufous for its whole length, except for the long black tip.

This beautiful species is represented by only a single flat skin, obtained by Mr. J. B. Hatcher in the "Southern Andes of Patagonia." *Cerdocyon magellanicus* is undoubtedly closely related to *Cerdocyon culpæus* (Molina), to which the present specimen may possibly be referable — a point impossible to establish in the absence of other material, especially from Tierra del Fuego, the type region of *C. magellanicus.* The present specimen, however, agrees exceedingly well with Mivart's colored plate of the type.

Mr. Brown's manuscript notes contain the following reference to the present species:

"A large fox, *Canis magellanicus*, is found in considerable numbers on Tierra del Fuego, and is reported from the Andes on the mainland. This animal varies considerably in size, some skins being as large as a coyote."

Mr. Prichard had a more intimate acquaintance with this species, and has presented the following interesting observations:

"The study of the Cordillera wolf (*Canis magellanicus*) from the present point of view is exceptionally interesting. To this animal man is practically unknown, and it manifested the most utter fearlessness, when brought into contact with human beings, during our expedition. This wolf will advance within five or six yards of a man within open daylight; it will walk over him when asleep in camp. They haunted our camps about Lake Buenos Aires, lurking about all the night through and eating everything that came within their reach; then, instead of departing when daylight came, they usually remained crouching near by, and put in an appearance during breakfast-time with an absolute disregard or ignorance of probable danger from the neighbourhood of man.

"On the River Fenix one of these wolves came into Rosy Camp during the night, stole a duck and a goose, and further gnawed my rifle-slings within a few feet of where I was sleeping. We only discovered our loss at dawn, and while we were still discussing it, I perceived the animal itself lying under a bush close at hand calmly watching us. Deprived of breakfast, I had no thought of mercy, and shot her with a Mauser. She was an old female. That night her mate paid us a visit, and frightened the horses, who seem to fear the large Cordillera wolf almost as much as the puma. I was rather crippled at the time with an injury to my knee, and was sitting by the fire. I happened to look up and caught sight of the wolf standing within a few yards of me. He quietly returned my look but made no movement to run away. In a moment or two I got up and limped across to fetch my gun, the wolf watching me with interest, but without the smallest sign of apprehension. As a matter of fact, he came a few steps nearer to me, still gazing at me fixedly. He also joined the majority in a very short space of time. We could not afford to have such desperate thieves about our camp. At another place in the same neighbourhood a wolf, coming in to investigate our camp, was attacked by my big deerhound Tom. The wolf made no attempt to escape but met his foe with a fearful bite, and in the end we had to go to Tom's assistance before the wolf could be killed.

"From these instances it will be seen that the Cordillera wolf has absolutely no fear of man. The pampa fox shares this characteristic, but possesses it in a much less prominent degree. . . ." (Prichard, *l. c.*, pp. 244, 245.)

"This is the animal locally known as the Cordillera fox. I have elsewhere touched upon its strongest characteristic of courage, and also the dread it inspires among horses. It is, of course, a much larger animal than the pampa fox, which latter can wander about among the troop without causing any disturbance. A single Cordillera wolf will attack young huemules as well as the young of the guanaco. Although found in the forest, this animal also frequents the plains at the foothills of the Cordillera. Personally I never observed it farther east than the River Fenix. In the one case that came under my observation, when sheep had been brought within its range, its depredations among them were considerable.

"The measurements which I made of three of these animals were as follows: Female killed at the River Fenix, Lake Buenos Aires, thirty-nine inches; dog-wolf killed at the same place, forty-one inches; dog-wolf killed at the Lake Argentino, forty-one inches. These measurements were taken from the teeth to the end of the tail directly after the shooting of the animals.

"When with young the Cordillera wolf, indeed I may say the Cordillera wolves, both male and female, will run growling towards man if he attempts to approach their litter. As far as could be judged from an examination of the lair of one, their bill of fare is very varied. There were the remains of many kinds of birds, as well as the bones of the young of guanaco and huemul." (Prichard, *l. c.*, p. 259.)

Family *FELIDÆ*.

According to Lahille[1] ten species of Felidæ occur as far south as the Argentine Republic, of which two are of doubtful status as Argentine species. Including the two Patagonia forms now recognized of the old *Felis concolor* group, four species of Lahille's list reach southern Patagonia.

In addition to these, the Jaguar (*Felis onca* Linn.) extends southward, according to authors, to northern Patagonia, ranging formerly to the Rio

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[1] Ensayo sobre la distribución geográfica de los mamiferos en la República Argentina. Por el Doctor F. Lahille. Congr. cient. Lat. Amer., 1898, III (1899), pp. 165–206, with map. Felidæ, pp. 177–179.

Negro. Mr. Prichard, however, states[1] that it is not now found south of the Rio Colorado, although as late as about 1890, according to the same authority, specimens were killed near the Rio Negro.

The nomenclature and classification of the Felidæ are in a far from satisfactory state. Some authors, even in quite recent times, have referred nearly all of the hundred and fifty or more species and subspecies to the single genus *Felis*, with or without subgenera. According to Dr. Palmer,[2] the generic and subgeneric names proposed for subdivisions of the Linnæan genus *Felis*, for the existing species alone, number 58, excluding a number of alternative names not enumerated by him. The family Felidæ is by no means homogeneous, and may for convenience be divided into a considerable number of superspecific groups, several of which are clearly entitled to recognition as genera, while many others will rank as either genera or subgenera, according to the individual predilection of systematists. In recent years more and more attention has been given to the discrimination of local forms or subspecies, so that in many instances groups formally considered as wide-ranging species have been found to consist of a considerable number of more or less well-marked types, each restricted to rather definite areas, and each apparently the product of special climatic and other conditions of environment. In some cases they appear to have become fully segregated "species," but in many instances are believed to merge, through gradual geographic intergradation. In any case, the number of new forms believed to be entitled to recognition in nomenclature has of late enormously increased. Groups that formerly were looked upon as constituting a single species, now often have the rank, numerically at least, of a superspecific (or subgeneric) group, while assemblages of species formerly rated as subgenera seem to acquire, from the standpoint alike of convenience and exact taxonomic expression, an enhanced valuation. While the general tendency is to recognize this higher rating of superspecific groups as consistent with the finer ultimate divisions, a few eminent "splitters" exhibit an inconsistent tendency to lump genera.

The Felids of Patagonia and immediately adjacent territory (northward to include Paraguay) fall into several quite distinct superspecific groups, none of which are properly referable to the restricted genus *Felis* (type,

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[1] Through the Heart of Patagonia, 1902, pp. 68, 248.

[2] Index Generum Mammalium, 1904, pp. 826–829.

Felis catus Linn.). The task of assigning to them their proper designations is by no means simple; the subjoined synonymy is an effort toward that end. In reviewing the names proposed for the numerous subdivisions of the Linnæan genus *Felis*, the number of synonyms based on a single species (at least five or six on *Felis planiceps*, and about the same number on *F. jubata*) is hardly less surprising than the frequency with which the same name has been used for widely different groups.

Severtzow, in a remarkable paper on the Felidæ, published in 1858, divided[1] the family into five genera and twenty-seven subgenera, to nearly all of which he gave new names (*l. c.*, X, pp. 385–389), regardless, in large part, of those given by previous authors. In most cases his subgenera were monotypic, and in addition to the names he adopted, he also provided alternative names for about one-fourth of them. We have hence names ready made for probably all possible contingencies. Yet a number of others were added by J. E. Gray in 1867,[2] but fortunately very few have been proposed since that date.[3]

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[1] Notice sur la classification multisériale des Carnivores, spécialement des Félidés, et les études de zoologie générale qui s'y rattachent; par M. N. Severtzow. Rev. et Mag. de Zoologie, 2e sér., IX, 1857, pp. 387–391, 433–439; X, 1858, pp. 3–8, 145–150, 193–196, 241–246, 385–393.

[2] Notes on the Skulls of Cats. Proc. Zoöl. Soc. London, 1867, pp. 258–277. Fourteen genera, 5 additional sections (3 named), and 60 species.

[3] The superspecific names applicable to the American cats are principally the following:

For the Lynxes:

Genus LINX Frisch.

Felis Linn., Syst. Nat., 1758, 41, part, namely, *Felis lynx*.

Linx Frisch, Das Natur-System vierfuss. Thiere, 1775, *apud* Palmer, Index Gen. Mamm., 1904, 954. Type, *Felis lynx* Linn.

Lynx Kerr, Anim. Kingd., 1792, 41, 155, as a subgenus of *Felis*.

Lynceus Gray, London Med. Repos., XV, April 1821, 302; preoccupied for a genus of Crustacea (Müller, 1785).

Lynchus Jardine, Jardine's Nat. Library, Mamm., I, 1834, 274, part; full genus. = *Lynceus* Gray. — Severtzow, Rev. et Mag. de Zool. (2), X, 1858, 385, 390, part; full genus.

Lyncus Gray, List Spec. Mamm. Brit. Mus., 1843, xx, 46; P. Z. S., 1867, 276; Cat. Carn., Pachy., and Edent. Mamm., 1869, 37. Full genus, restricted to the true Lynxes.

Lynx Gray, P. Z. S., 1867, 276; Cat. Carn. . . . Mamm., 1869, 37. Subgenus of *Lynchus*, to contain the *L. borealis* and *L. canadensis* groups.

Cervaria Gray, *ibid.*, subgenus of *Lyncus*, to include the *L. pardinus* and *L. ruffus* groups. Name preoccupied in Lepidoptera (Walker, 1866).

Eucervaria Palmer, Science, N. S., XVII, 873, May 29, 1903. To replace *Cervaria* Gray.

The Jaguar group has received the following:

Felis Linn., 1758, part (*Felis onca*); also in part of most subsequent authors.

Genus PUMA Jardine.

Felis in part, of many authors.

Puma Jardine, Jardine's Nat. Library, II, 1834, 266. Full genus, to include *Felis concolor*, *F. yagouarondi*, *F. eyra*, *F. pajeros*, and two nominal species. Type by elimination, *Felis concolor* Linn., or more strictly, *Felis puma* Molina.

Leopardus Gray, List Spec. Mamm. Brit. Mus., 1843, xix, 40–44, part.

Panthera Severtzow, Rev. et Mag. de Zool. (2), X, Sept. 1858, 384, 390, part = *Leopardus* Gray. Also *Panthera* Fitzinger, 1869, part.

Puma Severtzow, *ibid.*, 384, 390, a subgenus of *Panthera*, to include only *Felis concolor* Linn.

Uncia Cope, Amer. Nat., XIV, Dec., 1880, 852, and subsequently (part); nearly equal to *Leo*, *Tigris*, and *Leopardus* (part) of Gray, 1843. Not *Uncia* of Gray, 1854, restricted to the Ounces of Asia (*Felis uncia* and allies), but includes it.—Lahille, Congr. cient. Lat. Amer., III, 1899, 177, ex Cope.

PUMA PUMA PATAGONICA (Merriam).

Felis concolor (*nec* Linn.), in part, of most authors prior to 1901.

Felis (*Uncia*) *puma* Lahille, Congr. cient. Lat. Amer., III, 1899, 177, part.

Leopardus Gray, List Spec. Mamm. Brit. Mus., 1843, xix, 40–44; P. Z. S., 1867, 263–265; Cat. Carn., Pachy., and Edent. Mamm., 1869, 10–13, part; type, *Felis leopardus* Schreber.

Panthera Severtzow, Rev. et Mag. de Zool. (2), X, Sept. 1858, 386, 390, part, with the subgenera (1) *Jaguarius*, (2) *Panthera*, (3) *Uncia*, ex Gray, 1854, (4) *Puma*, ex Jardine, 1834; all monotypic except *Uncia*; subgenus *Panthera* = *Panthera* Frisch, 1775; genus *Panthera* = *Leopardus* Gray. Also *Panthera* Fitzinger, 1869, part.

Jaguarius Severtzow, *ibid.*, 386, 390, subgenus of *Panthera*, for *Felis onca* Linn.

Onca Severtzow, *ibid.*, 390; alternative name for *Jaguarius*.

For the Eyra and Yaguarondi Cats:

Felis, in part, of most authors, even when *Felis* is taken in a more or less restricted sense. Not *Felis* s. str., with *Felis catus* as type.

Puma Jardine, Jardine's Nat. Library, II, 1834, 266, part.

Herpailurus Severtzow, Rev. et Mag. de Zool., X, Sept., 1858, 385, 390; for *Felis eyra* and *F. yagouarondi*.

Eyra Severtzow, *ibid.*, 391, alternative name for *Herpailurus*.

Catopuma Lahille, Congr. cient. Lat. Amer., III, 1899, 179. Not *Catopuma* Severtzow, 1858, type *Felis moormensis* Hodgs.

The synonymy of the Pumas, the Pampa cat, the Ocelots and other small American spotted cats, is given below, in the main text, these groups having representatives in southern Patagonia.

Felis concolor puma Prichard, P. Z. S., 1902, I, 273 (field notes); Through Heart of Patagonia, 1902, 44, 45 (description and text figure of animal), 242–244 (habits), 251–253 (habits and distribution).

Felis puma patagonica Merriam, Proc. Washington Acad. Sci., III, 1901, 598 (Dec. 11, 1901). East base of Andes, Patagonia, lat. 47° 30′.

"*Color.*—Upperparts ash gray, everywhere abundantly mixed with black hairs, the median dorsal region from top of head to end of tail suffused with buffy; belly buffy gray, the hairs much longer than on the back; pectoral and inguinal regions soiled whitish; throat gray; chin and lips white, the posterior part of upper lip and cheeks suffused with buff; patch at base of whiskers gray (instead of black); rest of face gray, except a buffy streak above and below the eye; backs of ear gray, with apical third and a faint basal band dusky; feet buffy gray; tail pale buffy fulvous above, ash gray below, with only the extreme tip dusky.

"*Cranial Characters.*—Skull massive, elongate; facial and frontal regions low and narrow; interorbital region narrow; nasals rather broad posteriorly and obliquely truncate; sagittal crest low, continuous to frontal shield; bullæ rather large; postpalatal notch broad; the palatal margin nearly straight; presphenoid normal. Canines large (the upper ones 14.5 mm. in diameter); crowns of premolars and carnassials long; upper molar small (as usual in the group); inner cusp (protocone) of upper carnassial very small. Compared with the skull of *F. puma* from Santiago, Chile, the following tooth differences are conspicuous: crown 2d upper premolar larger and thinner; crown of upper carnassial longer, with inner tubercle greatly reduced; upper molar small (less than half the size of this tooth in *puma*); 2d lower premolar smaller (decidedly less swollen); lower carnassial decidedly larger.

"Compared with an old male *concolor* from São Paulo, Brazil, the facial and frontal regions are very much lower; frontal flatter; bullæ smaller; presphenoid narrower; sphenoid suture distinct; postpalatal notch broader; sagittal crest present; underjaw more massive, the symphysis much longer; canines much larger; crown of second upper premolar much longer and narrower; crowns of upper and lower carnassial (particularly the lower) decidedly longer; crowns of lower premolars longer, the 2d much more swollen posteriorly.

"*Remarks.*—Compared with the skin of a head of *F. puma* from Santiago, Chile, the color of the corresponding parts in *patagonica* is lighter and everywhere much grayer (less brownish and without fulvous cast); ears with distinct markings at base and tip; upper lip with only a trace of the dark mark below whiskers; lips and chin whiter; light band on under eyelid much broader and purer. Compared with subspecies *pearsoni* Thomas, the general color is much paler and grayer, the ear and face markings much more distinct, the tip of the tail dusky.

"*Measurements.* — (From dry skins). Total length 2015; tail vertebræ 670.

"*Cranial Measurements.* — Type specimen (♂ young adult) from base of Andes. Basal length 168; occipito-nasal length 177; zygomatic breadth 135; postpalatal length 86; interorbial breadth 36; upper carnassial 24.3." (Merriam, *l. c.*, pp. 598–600.)

Through the kindness of Dr. Merriam I am able to compare his type specimen (No. 108693, U. S. Nat. Mus.), skin and skull, with specimens of *pearsoni* from the Coy River. As shown by the skull, it is a young adult (said by Dr. Merriam to be a male), and the cranial differences between this skull and those of *pearsoni* pointed out by Dr. Merriam are sustained by further comparison with Rio Coy skulls, as the greater elevations of the frontal region and greater interorbial breadth of the Rio Coy specimens in comparison with the type skull of *patagonica*, and also the greater width and more abrupt posterior termination of the nasals. The teeth are much larger in *pearsoni*, the upper carnassial ($p^{\underline{4}}$) having a length of 26.5 mm. as against 24 in *patagonica*, and they are quite different in form; while the body of $p^{\underline{4}}$ in *pearsoni* is much broader, its transverse diameter at the front of the tooth is the same as in *patagonica*, owing to the much greater relative development of the deuterocone, which is also more pointed and more sharply set off from the body of the tooth. In other words, as said by Dr. Merriam (*l. c.*, p. 580), the inner tubercle or deuterocone is "largest and most distinct in a young male *Felis puma* from Santiago, Chile," while it is "nearly obsolete" in *pearsoni* from the coast region of Patagonia, "the inner side of the front part of the tooth sloping down [in *pearsoni*] to the inner root very gradually." The last cusp on $p^{\underline{3}}$ is greatly reduced in *patagonica* as compared with the same feature in *pearsoni*. Also the last upper molar in *patagonica* is less than one half the size of the same tooth in *pearsoni*. There are thus very good cranial and dental characters to separate the two forms, apparently even specifically.

In color the type of *patagonica* is very much darker — more varied with black-tipped hairs on the median dorsal area — than the gray phase of *pearsoni* (in summer-coat), while *patagonica* is in much fuller (probably winter) pelage. On the other hand, *pearsoni* is much more strongly suffused with fulvous throughout, while the ventral surface is strongly yellowish instead of nearly clear white as in *patagonica*. There is little difference in the distinctness of the dusky ear-markings in the two forms. In general terms, *patagonica* is darker above than the gray phase of *pearsoni*, and lighter below, and almost wholly lacks the strong fulvous suffusion that forms so strong a feature in even the light phase of *pearsoni*. With the "red" phase of *pearsoni* the contrast is so great that no comparison is necessary, though in all probability, as shown by Mr. Hatcher's observations, there is also a "red" phase of *patagonica*.

Finally, in view of the strong differences in dentition between the *puma* group and *pearsoni*, especially through the practical suppression of the deuterocone in $p^{\underline{4}}$ of *pearsoni* and its strong development in *patagonica*, I prefer for the present, or till more material is available for examination, to regard *pearsoni* as specifically distinct from both *Puma concolor* and *Puma puma*.

Mr. Hatcher describes the capture of the type specimen of *Puma puma patagonica*, and gives welcome information regarding its habits. He says:

"After some two weeks spent in the vicinity of Lake Pueyrredon, we decided to return to the coast. Messrs. Peterson and Brown, with the wagon and outfit, returned by the route by which we had come, while I parted company with them a short distance east of Lake Pueyrredon, and with pack-mule and saddle-horse started off to the south to explore the country lying between the lake and the headwaters of the Rios Belgrano and Chico. On the day previous to our separating, while ascending one of the lower benches of the bluff, that rises above the valley extending east of the lake, I observed a mountain lion that had been frightened from its place of concealment and went galloping up the bluff and across the narrow plain at the top. As the country was an open one and I was mounted on a good horse, this seemed an excellent opportunity and I was not slow in giving chase. Although the animal had several hundred yards the start of me, I rapidly gained on him, and when he reached the head of a small cañon at the opposite side of the narrow table I was not more than one hundred yards in the rear. On reaching the point where he had disappeared over the crest of the bluff I halted for a moment to reconnoitre. I knew the inability of this animal, like all the others of his tribe, to maintain any considerable speed for a long distance, and that when once beyond my sight he would seek refuge in concealment rather than flight. Over the slopes and bottom of the shallow cañon there was a considerable growth of scattered brush. By carefully scanning the ground about these I soon discovered the object of my search lying stretched at full length upon the ground. To despatch him with a rifle ball was the work of but a moment and required neither skill nor courage. I preserved both skin and skeleton, and, much to my surprise, they have been considered by Dr. C. Hart Merriam as belonging to a new subspecies.

"Pretty nearly every traveler in Patagonia has remarked upon the naturally timid and cowardly nature of the puma. So far from a general disposition to attack man they are, as a rule, exceedingly timid, and examples are not at all uncommon where, when brought to bay, they have sought the shelter of a bush, and, without offering any real resistance, allowed the hunter to despatch them with his sheath knife, or by knocking them in the head with his bolas. Such timidity is not, however, universally characteristic of these animals, which are among the most abundant and by far the largest and most powerful of the Patagonian Carnivora. A notable exception to this rule, which came to the writer's knowledge, may be mentioned in this connection, since the facts connected with it are supported by unimpeachable authority. The case referred to is that of Señor Theodoro Arneberg, Chief Engineer in charge of the work of the Southern Division of the Argentine Boundary Commission. While engaged in his work in the vicinity of Lake Viedma in the autumn of 1898, in walking one day through a tangled mass of brush and tall grass, he came suddenly and unexpetedly upon a puma lying in concealment. The animal not only made no attempt to escape, but, instantly and without warning, attacked the intruder in the most savage manner. Springing upon him with its full force, it hurled him to the ground, although Mr. Arneberg is a large and powerful man, and the lion seizing him by the lower jaw, succeeded in breaking out several teeth and otherwise mutilating its then comparatively helpless victim, before one of his companions could rush up and despatch the thoroughly angered brute, which, after it had been killed, was found to be a very old male." — Hatcher, Narrative, pp. 196–198.

Mr. Brown's notes, like Mr. Hatcher's, relate in part to both of the Patagonian forms, and are as follows:

"What appears to be two species of lion, judging from the pelage, are found in southern Patagonia, ranging from the Andes to the coast. Both species are found along the coast, although it is generally understood by the sheep farmers that the red lion is a native of the mountains and follows the guanacos to the coast as those animals are driven to the sea board by the winter snows.

"I counted six lions one day while riding in the foot hills of the Andes in February, all of a decided ferruginous buff color. The gray species resembles our northern *Felis concolor* in pelage and is most often met along the coast.

"Neither species seems as fierce as the North American lion, probably because of the ease with which they get food. I heard of but one instance of a lion attacking a man, and that was in the mountains where the guanacos were scarce. The natives do not hesitate to ride onto a lion and kill it with a stirrup iron if a gun is not handy. I was on one hunt where this was done, and my friend said he had killed many in this way. I preferred, however, to shoot mine.

"In the broken camp along the coast where caves are numerous the lions breed in considerable numbers causing great destruction among the sheep. In riding through a paddock one morning I counted sixty little lambs lying dead on a side hill where during the night a lioness with two cubs had run through the bunch batting the lambs as a kitten plays with a ball." — Barnum Brown, MSS. notes.

Mr. Prichard's account of the Puma, which he calls *Felis concolor puma*, is quite in agreement with the statements of Hatcher and Brown. He credits the Puma with attacking man, but only in rare instances and in wild places remote from settlements. He says that in the Cordillera "they actually reconnoitred the camp," and "often stampeded our horses and left plain tracks near the camp, but in spite of this they killed no animal, not even a dog, belonging to us."

"Puma cubs," he says, "in captivity become very tame. One settler whom I met had two cubs about a year old. They were attached to their new home, and though they would follow a horse for two hundred yards or so, they invariably returned after a short distance to the shanty of their owner. Another puma cub . . . was wont to fight battles royal with the hounds, but in the cold of winter would lie among them for warmth. All of these cubs were those of *Felis concolor puma*. So long as they were well fed they were docile, but when hungry their fierce nature reasserted itself. Mr. Cattle had finally to shoot the cub that belonged to him. Mr. Waring, however, still had his at the time of my departure. I heard these two killed a colt in the month of May." (Through Patagonia, pp. 222–244.)

"This," Mr. Prichard continues, "is the silver-gray variety of puma most commonly met with in Patagonia. The distribution of this animal extends over the entire country. It is to be found in the Cordillera as on the pampas. . . . The number of pumas in Patagonia is very great, more so than any zoölogist has yet given an idea of. During one winter two pioneers killed seventy-three near Lake Argentino. Near San Julian immense numbers are yearly destroyed, but lately, owing to the advent of settlers, they are becoming less numerous. At Bahia Camerones, on the farm of Mr. Greenshields, fourteen pumas were killed during the winter of 1900.

"A female killed near Santa Cruz measured 6 ft. 10 in., and a male killed near Lake Argentino 8 ft. 1 in.

"The puma can easily be galloped down, as it rarely runs more than 300 yards or a quarter of a mile when pursued on horseback. It invariably stands at bay with its back to a bush or a rock.

"In strong contradistinction to the habit of the *Felis onca* (jaguar), *F. c. puma*, when hunting, kills a number of animals from a flock or herd. To one only of these kills, however, does it return, and it always makes some pretense of burying the victim singled out for its meal, throwing upon the body in many cases merely a small bunch of thorns. This custom of the puma is frequently taken advantage of by the shepherds, who poison the chosen carcass. The puma, ninety times out of a hundred, makes its first meal upon the entrails of the victim or upon the thigh inside of the groin.

"The destruction wrought by pumas upon flocks of sheep is immense. One animal killed upwards of 100 head from among a single flock. One night alone its total amounted to fourteen. Another point in connection with the predatory habits of the puma is that it will travel a long distance, even as much as ten or twelve miles, after killing.

"Its method of attack, judging from an examination of its victims, appears to be to spring upon the shoulders of its quarry and to break its neck. Cases are reported of pumas attacking horses, but no instance of this came under my notice. They generally select a stormy and tempestuous night during which to make their depredations. It is rather curious, as occasionally happens, to see a herd of cows with their calves take up the trail of a puma with a great deal of lowing and fuss, but they do not follow it for any distance. . . .

"Pumas are more often destroyed in winter, when the snow lies on the ground, and their tracks can be followed to their hiding places; otherwise they are so marvellously expert in concealing themselves that it is often impossible to find their lair." (*L. c.*, pp. 251–253.)

So far as known, the mainland of Patagonia forms the southern limit of distribution of both forms, they being unknown on Tierra del Fuego and neighboring islands. How far they range to the northward, or what their geographical relations are with the more northern forms of the Puma group, are matters at present quite unknown.

PUMA PEARSONI (Thomas).

(Plates XXV, Animal, gray phase; XXVI, Animal, red phase; XXVII–XXIX, Skull.)[1]

Felis concolor (*nec* Linn.) in part, of most authors prior to 1901.—Cunningham, Nat. Hist. Strait Magellan, 1871, 106, pl. facing p. 118, skull, from near Sandy Point, Patagonia.

Felis concolor pearsoni Thomas, Ann. & Mag. Nat. Hist. (7), VIII, Sept., 1901, 188. Santa Cruz, Patagonia, about 70 miles inland.—Prichard, P. Z. S., 1902, 274 (field notes); Through Heart of Patagonia, 1902, 155, 253 (account of the type specimen and colored plate of animal), 334, 335 (reprint of the original description by Oldfield Thomas).

Felis puma pearsoni Merriam, Proc. Washington Acad. Sci., III, 1891, 600 (Dec. 11, 1901). Based on Thomas, as above.

Red phase.—Am. Mus., No. 17434, ♀, Smith's Ranch, near mouth of Rio Coy, about sixty miles south of Santa Cruz, Patagonia; Barnum Brown. Total length, 2332 mm.; head and body, 1557; tail, without hairs, 775; hairs at end of tail, 50; ear from top of head in dried skin, 80.

Top of head, top of neck and shoulders ferruginous buffy, the tips of the hairs grayish and with a slight mixture of black-tipped hairs. This color extends down the median line of the back, forming a distinct dorsal band from two to several inches in width, but strongly varied with blackish tipped hairs. Sides of the body and outer sides of limbs pale buffy gray; ventral surface and inner side of the limbs white, the basal portion more or less buffy, particularly at the base on the abdomen. Tail strongly bicolor, the dark dorsal band being continued down the upper surface of the tail to the tip, the sides and lower surface of the tail being buffy white. Eyelids and an indistinct patch on the upper lip at the base of the whiskers blackish. Forehead and nose brownish gray, lighter and more whitish between the orbits. Ears buffy gray, mixed strongly with blackish at the base and tip, leaving an enclosed large grayish area over the middle portion. The dark color at the base and tip is strongest at the base of the ear and lighter and more mixed with brown at the apical border.

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[1] *Felis pearsoni* on the plates.

This specimen is evidently in winter coat, judging by the fullness and length of the pelage, the hairs of the upper surface of the body averaging from 25 to 30 mm. in length, while the white hairs of the lower part of the abdomen (inguinal region) attain a length of 70 to 80 mm.

Gray phase.—Am. Mus., No. 17433, ♀, Smith's Ranch, near mouth of Rio Coy, on the coast, about sixty miles south of Santa Cruz, Patagonia; Barnum Brown. Total length, 2285; head and body, 1470; tail without hairs, 815; hairs at end of tail, 55; ear from top of head in dried skin, 80.

General color above gray, slightly inclined to ferruginous on the top of the head and less so on the shoulders. A dark rufescent brown dorsal stripe about 2 to 3 inches in width extends from the shoulders to the base of the tail, slightly varied with black-tipped hairs. The gray of the sides becomes paler toward the lateral line and passes insensibly into pale buffy white on the ventral surface and inner surface of the limbs. Outer surface of the limbs like the sides of the body. Tail sharply bicolor, the upper third being a continuation of the dorsal band, but darker and more mixed with ferruginous. Sides and front of the face gray, slightly varied with black-tipped hairs; a blackish patch at the base of the whiskers; upper eyelid edged with blackish. Ears black at the base and tip, enclosing a large patch of gray.

This specimen is evidently in summer coat, the pelage being short, scarcely exceeding 15 mm. in length on the upper surface of the body.

A young example, in spotted coat (Am. Mus., No. 17435), also collected by Mr. Barnum Brown, differs considerably in color from the adult, as follows: General color above dull pale fulvous, darker over the shoulders, along the median line, and on the outer surface of the fore limbs. Middle of the dorsal region, from the shoulders to the tail, striped and spotted with dark brown, three fairly distinct stripes running from just behind the shoulders nearly to the base of the tail, the median one darkest, and strongly defined over the posterior part of the back, and continued along the upper surface of the tail. Sides of the body indistinctly blotched with pale brown, the spots becoming more distinct and darker on the outer surface of the hind limbs. Ventral surface yellowish white, distinctly blotched with dark brown, especially on the inner side of the fore limbs. Top of the head darker than the nape and similar to the color on the top of the shoulders, except more mixed with grayish; a narrow black superciliary streak, and above this a small oval vertical blackish spot. Anterior canthus of the eye also blackish and a quite broad distinct black spot at the base of the whiskers. Back of the ears blackish brown, with a distinct paler median spot, not at all conspicuous, so that the outer surface of the ear is nearly uniform dusky brown. Forehead from the anterior canthus of the eye posteriorly to the termination of the black temple spot whitish, mixed with brownish medially. Cheeks and upper lip whitish. Nose grayish brown mixed with dusky. Fore and hind feet externally grayish fulvous, with indistinct dusky spots at the base of the toes on the fore feet. Tail on the sides and below pale fulvous brown, with a median dark stripe continued from the back over the basal half; the posterior third of the tail wholly dusky brown becoming nearly black towards and at the tip.

Skull. — The Pearson Puma is represented by two adult specimens one of which is a very old adult with strong sagittal and occipital crests; the other is fully adult. In the principal dimensions of the skull these specimens agree almost exactly with the measurements given by Dr. Merriam (Proc. Wash. Acad. Science, Vol. III, 1901, pp. 587, 588) of *Puma hippolestes* from Colorado. The chief difference consists in the much greater development of the teeth of the Patagonian form, especially the upper carnassial and molar, which considerably exceed those of the largest specimens of the *hippolestes* group. The principal measurements of the two Patagonian skulls are as follows, the larger measurements relating to the older of the two specimens: Basal length, 193 and 187; occipito-nasal length, 194.5 and 192; basal length of Hensel, 186 and 182; zygomatic breadth, 156 and 155; foramen magnum to plane of back of last premolar, 113 and 112; interorbital breadth, 49 and 47.3; lower jaw, symphysis to condyle, 150 and 144; length of upper carnassial, 27 and 27. The upper molar has a transverse breadth of 8.6, with a length of 4 in one specimen and in the other it measures 11 x 5; this tooth being two to three times the size of the corresponding tooth in the North American forms of *Puma hippolestes*, etc.

Another striking feature of the dentition is the almost complete absence of the inner tubercle or deuterocone of the upper carnassial.

The dental armature is exceedingly heavy, the upper toothrow having a length of 52 mm. in one specimen and 50 in the other, exclusive of the molar. In the older specimens the canines have a transverse diameter of 16 and an antero-posterior diameter of 20.5, measured at the alveolar border. This specimen has the appearance of being a male. A very old *male* skull from Arizona, in which the sagittal crest is strongly developed, has teeth only half as massive as in the Patagonian skulls, which exceed in size any of the Colorado specimens of *hippolestes* of which measurements are given by Dr. Merriam.

In most respects these skulls agree with the skull of *Puma puma* from Santiago, Chili, described by Dr. Merriam (*l. c.*, page 597), except that it is larger, with even heavier dentition, and lacks the inner tubercle of the upper carnassial, which Dr. Merriam describes as "very large" in *P. puma.*

Color Phases.—The Pearson Puma presents two strongly marked phases of coloration, which appear to be purely individual and not due to either season or sex. The specimens from which the two phases of color are described above were both taken on the same ranch in Santa Cruz, but obviously at different seasons of the year. Mr. Hatcher informed me, in a letter dated December 28, 1901, that he "frequently saw and examined sets of from six to a dozen skins of these animals killed on the same farm and observed that in each instance there was every shade of color represented from very light brown or gray to dark tawny. This was true alike of individuals taken on the plains or along the mountains. I believe the color of the pelage due very largely to the season, while at the same time depending somewhat on the age and sex of the individual. In no way do I think it of specific importance."

This wide range of color variation of the Pumas is not restricted to those of Patagonia, but is recorded by Dr. Merriam as occurring in several of the North American forms. He says: "Most of the Cougars present two color phases independent of season. One of these is usually redder than the other. Thus at any time of the year the animal of the Puget Sound region (*F. olympus*) may be 'red' or 'brown'—both of these terms, it must be understood, giving an exaggerated idea of the real color and of the difference between the two. On Vancouver Island, according to John Fanin, Curator of the Provincial Museum at Victoria, the brown pelage is the common one; the red pelage rather rare. On the mainland the red is more common. In the case of the Rocky Mountain species (*hippolestes*), according to Roosevelt [Scribner's Magazine, October, 1901, p. 435], the colors designated as 'red' and 'blue' are equally divided, six of each being recorded among the twelve animals killed by him in mid-winter in Colorado." (*L. c.*, p. 580, and table, p. 587.)

A wide range of color variation is probably present throughout the Puma group, to such an extent that characters based on coloration have very little importance; yet, in the present scarcity of material, authors are apt to lay more or less stress on such features. Thus Dr. Merriam describes his *Felis puma patagonica*, from the eastern base of the Andes, Patagonia, as being gray, with the black on the back of the ears nearly obsolete, while Mr. Thomas, in describing his *Felis concolor pearsoni*, based on a skin from Santa Cruz, coast of Patagonia, gives the coloration as fulvous or clay color, with the black on the back of the ears obsolete.

In the three specimens collected by Mr. Barnum Brown, described above, the black on the back of the ears is nearly obsolete in one, fairly distinct in another, and very strongly developed in the young specimen in spotted coat, all of these specimens being from the same locality. It would thus appear that the pattern of marking on the ear is also a variable feature, and in all probability subject to much seasonal variation.

Mr. Prichard (*l. c.*, p. 253) appears to believe that *Puma pearsoni* is especially distinguished from *P. patagonica* by its red color ("reddish-fawn instead of silver-gray"); but his personal knowledge of it appears to be confined to the type specimen, taken by him on the coast near Santa Cruz.

Genus ONCOIDES Severtzow.

Felis Linn., part, and in part of most authors.

Leopardus Gray, Ann. & Mag. Nat. Hist., X, Dec. 1842, 260, part; also Gray, 1843, 1867 and 1868, part, and of several subsequent authors who have employed the name.

Panthera Fitzinger, 1869, part.

Oncoides Severtzow, Rev. et Mag. de Zool. (2), X, Sept. 1858, 386; as a subgenus of *Felis*; includes *Felis pardalis* Linn., *Felis macroura* Wied (= *F. wiedi* Schinz, of earlier date), and *Felis tigrina*. Type, *Felis pardalis* Linn. Also of Trouessart, 1897, part, and of Lahille, 1899.

Pardalis Severtzow, *ibid.*, 391, alternative name for *Oncoides*.

Oncifelis Severtzow, *ibid.*, subgenus of *Felis*, to include only *Felis geoffroyi* Gervais.

Pardalina Gray, P. Z. S., 1867, 266. Type and only species, *Pardalina warwickii* Gray = *Felis geoffroyi* D'Orb. & Gerv., *apud* Sclater, P. Z. S., 1890, 796, and Elliot, P. Z. S., 1872, 203.

Pardalis Gray, P. Z. S., 1867, 270, as a subgenus of *Felis;* includes *F. pardalis* Linn., *Leopardus griseus* Gray, *Felis melanurus* Ball, and *Leopardus pictus* Gray. Type, *Felis pardalis* Linn.

Margay Gray, P. Z. S., 1867, 271; subgenus of *Felis*, to include *Felis macroura* Wied (= *F. wiedi* Schinz), *F. mitis* F. Cuv., *F. geoffroyi* Gerv., *F. colocola* Molina.

Zibethailurus Lahille, Congr. cient. Lat. Amer., III, 1899, 178; includes only *Felis pardalis* Linn; not *Zibethailurus* Severtzow, type and only species, *Felis viverrina* Bennett.

The name *Leopardus* Gray was apparently first used by him in a paper entitled "Descriptions of some new genera and fifty unrecorded species of Mammalia" (Ann. and Mag. Nat. Hist., Vol. X, Dec., 1842, pp. 255–267), in describing four new species of cats, two of which (*Leopardus griseus* and *L. pictus*) were from Central America, and two (*L. ellioti*, and *L. horsfieldi*) from India. There is nothing in this conection to indicate that the genus *Leopardus* was new, as is the case with ten other genera described in the same paper. A few months later (List Spec. Mamm. in Brit. Mus., 1843, pp. 40–44) he employed the name to cover a group of twenty-four species, the first of which was *Felis leopardus* Schreber, and this, bearing the same name as the genus, becomes, by rules widely accepted, the type of the genus *Leopardus*. In subsequent papers (mainly in 1867), he greatly restricted the genus by transferring from it nearly all of the species, except the *Felis leopardus* group, to other genera, including the four species originally associated with it in 1842, the two Central American species being transferred to a section (or subgenus) *Par-*

dalis of his restricted genus *Felis*. In the meantime, however, Severtzow proposed (in 1858) *Oncoides*, as a subgenus of his restricted genus *Felis*, for *Felis pardalis*, *F. macroura*, and *F. tigrina;* and also in the same paper (see synonymy above), *Oncifelis* for *Felis geoffroyi*, *Noctifelis* for *F. guigna*, *Lynchailurus* for *F. pajeros*, and *Herpailurus* for *F. jaguarondi* and *F. eyra*, all as subgenera of his restricted genus *Felis*. Names are thus provided for each of the several hitherto recognized minor groups of the smaller Central and South American cats, whether spotted or plain-colored. In the absence of sufficient material for a satisfactory revision of the South American cats, *Felis geoffroyi* is here placed in *Oncoides* with the other small spotted species, although it is evident that they constitute several well-marked sections or subgenera of *Oncoides*.

ONCOIDES GEOFFROYI (D'Orb. & Gerv.).

Felis geoffroyi D'Orbigny & Gervais, Bull. Soc. Philom., 1844, 40; Mag. de Zool., 1844, Mamm., pl. lvii, animal; Voy. Amér. Mérid., 1847, 21, pl. xiii (skull), pl. xiv (animal). Rio Negro, Patagonia.—Gray, P. Z. S., 1867, 272; Cat. Carn., Pach., and Edent. Mamm. Br. Mus., 1869, 23.—Sclater, P. Z. S., 1870, 796 (Paraguay).—Elliot, P. Z. S., 1872, 203; Mon. Felidæ, 1883, pl. xx.—Burmeister, Descrip. phys. Rép. Argent., III, 1879, 124.—Matschie, Sitzb. Ges. Nat. Fr. Berlin, 1894, 59.—A. Milne-Edwards, Miss. Cap Horn, Zool., Mamm., VI, 1890, 3, Santa Cruz, Patagonia.

Felis (*Oncifelis*) *geoffroyi* Severtzow, Rev. et Mag. de Zool. (2), X, 1858, 386, "la Plata, Patagonie."

Felis (*Oncoides*) *geoffroyi* Lahille, Congr. cient. Lat. Amer., III, 1899, 178.

Pardalina warwickii Gray, P. Z. S., 1867, 267, fig. 4 (skull), 405, pl. xxiv (animal); "Himalaya (*Warwick*). Probably from South America?"; Cat. Carn., Pach., and Edent. Mamm. Br. Mus., 1869, 14 (same as the last). (*Cf.* Sclater, P. Z. S., 1870, 796; Elliot, P. Z. S., 1872, 203.)

Felis pardinoides Gray, P. Z. S., 1867, 400; Cat. Carn. . . . Mamm., 1869, 27 (*cf.* Elliot, P. Z. S., 1872, 203).

Felis guigna Mivart (not Molina), The Cat, 1881, 410.

External Characters.—No. 16696, ♂ adult, Cañon de las Vacas, July 25, 1899; Barnum Brown. Ground color above pale yellowish gray over the median dorsal region, lighter gray and less yellowish on the sides, passing into white on the ventral surface, everywhere irregularly spotted or streaked with black; sides of nose, edge of upper lip, a narrow streak below the eyes and a broader one above the eyes, cheeks and chin white or yellowish white; top of nose and front of head to posterior canthus of eyes grizzled yellowish gray and black; a narrow streak from nose to eye, small spot over the eye, three narrow streaks on sides of nose in the mystacial region, a streak beneath the eye, joining a broader streak behind the eye running along the side of the face, and another below this across the cheek and joining a broad transverse bar across the throat black; five narrow black stripes continued from top of head over the top of neck to the shoulders with an additional stripe on each side on the neck; area of the back from shoulders to tail, more or less blended, and giving a prevailing blackish tint to the whole median dorsal region; on each side of the median area the black spots are more scattered, variable in size and in outline from circular to elliptical, sometimes merging to form short stripes; on the flanks, limbs and ventral surface the spots are more scattered and larger, and on the ventral surface sharply contrast with the white ground color; palms and soles dark blackish brown; ears externally black with a broad central patch grayish white; tail with the basal two thirds heavily spotted and half-ringed with black, the apical third ringed and tipped with black, the last four or five rings completely encircling the tail.

Another specimen (J. B. Hatcher, mouth of Santa Cruz River) is practically the same in the general tone of the ground color, but the spots on the sides of the body are smaller, more uniformly circular and more numerous, and the stripes running from head to shoulders are less regular and continuous, and the middle of the dorsal region has the black spots and streaks less massed, giving the effect of much less black.

Measurements. — No. 16696, ♂, a flat skin gives the following dimensions, which are, of course, only approximate: Head and body, 800 mm.; tail vertebræ, 360; tip to tip of outstretched fore limbs, 690; ear from crown, 50. *Skull*: Total length, 108; basal length, 98; palatal length, 39; length of nasals, 26.5; breadth of nasals, anterior, 14, posterior, 5.5; zygomatic breadth, 73; mastoid breadth, 44.3; postorbital breadth, 28; greatest breadth of brain-case, 45; breadth at base of canines, 28; upper toothrow (molar-premolar series), 24; length of p.^{4}, 13.2; breadth at deuterocone, 3.5; m.$^{\underline{1}}$, length, 2; transverse breadth, 5.5; lower jaw, length, 69; height at condyle, 10; height at coronoid, 34; depth at m.$_{\overline{1}}$, 12; length of toothrow, 23.

There is a striking similarity in size and general form between the skulls of *O. geoffroyi* and *L. pajeros crucina*, the two skulls before me representing these two species differing in general dimensions by only a few millimeters. The chief difference in general conformation consists in the greater and more abrupt expansion posteriorly of the zygomatic arches in *crucina* and the much greater width of the posterior nares. In dentition, however, the differences are marked, the dental armature being much heavier in *geoffroyi* than in *crucina*; the upper molar is more than twice as large in the former, and the upper premolars are longer and broader. In *geoffroyi* the lower molar has the posterior cusp or talon strongly developed, while in *crucina* it is practically obsolete, being represented by a barely perceptible knob on the inner posterior border of the cingulum.

O. geoffroyi has the skull relatively shorter and broader than in the *O. pardalis* group, with weaker dentition; it is, of course, a much smaller animal, with a relatively longer tail. It is, however, very much more different from the long-tailed, very small cats of the *O. wiedi* group.

GEOGRAPHICAL DISTRIBUTION. — *Felis geoffroyi* was originally made known from specimens collected by D'Orbigny on the banks of the Rio Negro, Patagonia. The specimens in the present collection show it to range southward to the Rio Gallegos, some five hundred miles to the southward of the type locality, and near the southern boundary of Patagonia, where it is apparently not uncommon. Burmeister reports it as occurring throughout the Argentine Republic, and states that he has seen it on the Paraná and Tucuma, and that it was found by Leubold at Mendoza.

GENERAL HISTORY. — Molina, in 1782, gave the name *Felis guigna* to a small spotted cat found in the forests of Chili, but his brief description is inadequate for the satisfactory determination of the species. The name, however, has been employed by some authors for the Patagonian animal, described as *Felis geoffroyi* by D'Orbigny and Gervais in 1844. Dr. J. E. Gray, in 1867, described a cat supposed to have come from the Himalayas, as *Pardalina warwickii*. It has since been identified by Dr. Sclater (*l. c.*) and Mr. D. G. Elliot (*l. c.*) with *Felis geoffroyi*, its supposed Indian origin having proved to be erroneous.

The *Felis guigna* of Philippi (Arch. f. Naturg., 1873, pp. 8–15, pll. ii and iii) from the province of Valdivia, Chili, is evidently very different from the Patagonian *Felis geoffroyi*, being much smaller and differently colored, with quite different cranial characters, and doubtless represents the true *F. guigna* of Molina.

Genus LYNCHAILURUS Severtzow.

Felis auct. plur., part, not of Linnæus.

Puma Jardine, part; *Leopardus* Gray, part.

Lynchailurus Severtzow, Rev. et Mag. Zool. (2), X, Sept., 1858, 386; to include only *Felis pajeros* Desm.

Pajeros Gray, P. Z. S., 1867, 269; type and only species, *Felis pajeros* Desm.

Felis, s. str. Lahille, Congr. cient. Lat. Amer., III, 1899, 178, for *Felis pajeros* Desm.

LYNCHAILURUS PAJEROS CRUCINA (Thomas).

(Plate XXIV, Skull.)[1]

Le Chat Pampa, Azara, Quad. Par., I, 1801, 179, part.

L[*eo*] *brunneus* Oken, Lehrb. Zool., II, 1816, 1070 (in part). Obviously based on le Chat Pampa of Azara. (*Cf.* Allen, Bull. Am. Mus. Nat. Hist., XVI, 1902, 379.)

Felis pajeros Desmarest, Nouv. Dict. d'Hist. Nat., VI, 1816, 114; Mamm. 1820, 231 (in part). Based on Azara.

Felis pajeros Waterhouse, Zoöl. Voy. Beagle, Mamm., 1839, 18, pl. ix, animal. Santa Cruz and Bahia Blanca. — D'Orbigny & Gervais, Mag. de Zool., 1844, Mammifères, pl. lviii, animal, Patagonia. — Gervais, Zool. Bonite, I, 1841, 34, pl. vii. — Philippi, Arch. f. Naturg. 1873, i, 8, pl. iii, fig. 2, 3, skull. — Burmeister, Desc. phys. Rép. Arg., 1879, III, 128. — Mivart, The Cat, 1881, 423, in part. — Matschie, Sitzungsb. Ges. Nat. Fr. Berlin, 1894, 60. — Lahille, Congr. cient. Lat. Amer., III, 1899, 178, part.

Pajeros pampanus Gray, P. Z. S., 1867, 269 (in part = *Felis pajeros* Desm.); Cat. Carniv. Br. Mus., 1869, 18, part.

Felis passerum Sclater, List Vert. Anim., 1872, 40. (*F. passerum* proposed as a Latin substitute for *F. pajeros!*)

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[1] *Felis pajeros crucina* on plate.

Felis pajero Berg, Com. Mus. nac. de Buenos Aires, I, 1900, 219 (emendation of *F. pajeros* Desm.).

Felis pajeros crucina Thomas, Ann. & Mag., Nat. Hist. (7), VIII, Sept., 1901, 247. Based on the Santa Cruz specimen collected by Darwin and described and figured by Waterhouse, as above cited.

External Characters. — No. 16695, male adult, Rio Gallagos, 20 miles from coast, August 12, 1899, collected and presented to the American Museum of Natural History by Mr. Barnum Brown. In winter pelage.

Pelage long and full. Especially characterized by a crest of elongated hairs along the middle of the dorsal area. General color above pale gray with a suffusion of fulvous beneath the surface and varied with black-tipped hairs; a distinct median stripe of elongated hairs extends from a little behind the shoulders to the base of the tail, the longest hairs forming a prominent crest along the middle dorsal region. These hairs are brownish fulvous at the base for three fourths of their length, then ringed with black, the band being well outlined as a pale fulvous median stripe varied with black. Sides of the nose whitish and a white ring encloses the eye except posteriorly; edge of the upper lip, chin and throat white, the lower throat marbled with irregular bands of dull fulvous, mostly concealed beneath the surface, but forming distinct crossbars on the extreme upper chest where they become darker and are succeeded by irregular narrow crossbars of black. Sides of the body with indistinct black fulvous stripes nearly concealed by the tips of the hairs, only the under-fur being fulvous. These stripes extend forward indistinctly to the cheeks, there being one just below the eye and another near the lower part of the cheek. Abdomen white, with large blackish spots more or less suffused with fulvous. Fore leg whitish with two broad rings of black and a third imperfect ring below strongly suffused with fulvous. Forefoot below fulvous, irregularly blotched with deeper fulvous. Hindfoot below fulvous, the soles deep fulvous, the lower part of the hind leg imperfectly ringed with blackish, suffused with fulvous. Ears gray posteriorly darkening to form a prominent black spot at the tip; along the edge of the ear fulvous white, the hairs of the front margin elongated. Tail grayish fulvous, the hairs brownish plumbeous basally, ringed near the tip with black and below fulvous with many black-tipped hairs; base of the tail below fulvous white.

Measurements from flat skin, tail slightly imperfect. Head and body, 790 mm.; tail, 270?; ear from crown, 45. Mr. Waterhouse gives the measurements of his Santa Cruz specimen, reduced to millimeters as follows: Length from nose to root of tail, 660; length from nose to base of ear, 89; length of tail (fur included), 279; length of ear, 26.3; height of body at shoulders, 330.

Skull: (No. 16695, Rio Gallegos; Barnum Brown). Total length, 109; basal length, 98; palatal length, 40; length of nasals, 25; breadth of nasals, anterior, 14, posterior, 6; zygomatic breadth, 79; mastoid breadth, 50; postorbital breadth, 29; greatest breadth of brain case, 41; breadth at base of canines, 29; upper toothrow (molar-premolar series, first premolar lacking), 20.3; length of p.^{4}, 11.5; breadth at deuterocone, 5; m.^{1}, length, 2, breadth, 4; lower jaw, length, 69.5; height at condyle, 14; height at coronoid, 31.5; depth at m.$_1$, 31; length of toothrow, 22. In this skull there is no trace of p.^{3} on either side, nor any indication of its former presence.

General History.—As shown by the references given above, the Pampa Cat was first described by Azara in 1801, under the vernacular name *Le Chat Pampa.* His description was the basis, in 1816, of two specific names, *brunneus* of Oken and *pajeros* of Desmarest. As it is doubtless impossible to determine which name was published first, and as the name *pajeros* has always been current and *brunneus* has almost escaped notice, the propriety of retaining the name *pajeros* as the specific name of the group is evident.

Mr. Brown informs me that this specimen was the only one he met with during his explorations in Patagonia. He states that it is very rare, being almost unknown to the residents of that country. Neither was it met by Mr. Hatcher during his three years work in Patagonia, nor is it mentioned by Prichard.

This form of the Pampa Cat was first described by Waterhouse in the "Zoölogy of the Beagle" (*l. c.*) who speaks of it as being remarkable for the length of the fur, and especially for the crest of elongated hair along the median line of the back. This crest is not mentioned in his description, nor is it shown in the colored plate. He says the animal is variable in markings and in the intensity of coloration. The specimen described by Mr. Waterhouse, became, in 1901, the type of Mr. Thomas's *Felis pajeros crucina.*

Darwin, in his notes on this species, as published by Waterhouse, says: "This animal takes its name from 'paja', the Spanish word for straw, from its habit of frequenting reeds. It is common over the whole of the great plains, which compose the eastern side of the southern part of America. According to Azara, it extends northward as far as latitude 30°, and to the south, I have reasons to believe, from accounts I have received, that it is found near the Strait of Magellan, which would give it a range of nearly 1400 miles, in a north and south line. One of my specimens was obtained in 50° south, at Santa Cruz: it was met with in a valley, where a few thickets were growing. When disturbed, it did not run away, but drew itself up, and hissed. My other specimen was half-grown, and was killed in the end of August, at Bahia Blanca."

Order CHIROPTERA.

Family *VESPERTILIONIDÆ.*

While Bats in great variety reach Paraguay and northern Argentina, representing at least ten genera and about twenty species, only four species appear to have been authentically recorded from Patagonia south of the Rio Negro. None of these is represented by specimens in the collections made by the Princeton Patagonia Expeditions. Mr. Brown reports seeing a skin of a large bat in the possession of a ranchman, as noted below, which, from his account of it, was apparently *Histiotus velatus.* All of the bats reported from southern Patagonia belong to the family Vespertilionidæ, and to genera that reach, also, the highest latitudes attained by bats in the northern hemisphere.

Genus MYOTIS Kaup.

Myotis chiloensis (Waterhouse).

Vespertilio chiloensis Waterhouse, Zoöl. Voy. Beagle, Mamm., 1839, 5, pl. iii, animal. Island of Chiloe, Chili. — Wagner, Schreber's Säug. Suppl., I, 1840, 536 (from Waterhouse); V, 1855, 753. — Dobson, Cat. Chirop., 1878, 322. — Lataste, Act. Soc. scien. du Chili, I, 1892, 79.

Myotis chiloensis Lahille, Congr. cient. Lat. Amer., III, 1899, 174.

Not *Vespertilio chiloensis* P. Gervais.

This species was described from a specimen obtained on one of the islets on the eastern side of the island of Chiloe, as stated by Darwin (in

Waterhouse, *l. c.*), who also says that he "saw one of these animals on the wing" in Tierra del Fuego. Dobson cites a specimen from Mendoza, Argentina; Lataste cites Valdivia, San Fernando, and Santiago, Chili; Lahille gives its range as southeastern Patagonia, Chili, and the southern part of his sub-andean province.

Genus HISTIOTUS Gervais.

HISTIOTUS VELATUS Gervais.

Plecotus velatus Gervais, Ann. Sci. Nat. (1), III, 1824, 446 (Curityba, Brazil).—Is. Geoffroy St.-Hilaire, Mag. de Zool., II, 1832, Cl. I, pl. ii, animal (same specimen as above).—Wagner, Schreber's Säug. Suppl., V, 1855, 717.—Pelzeln, Bras. Säug., 1883, 44, Ypanema, Brazil, Natterer.

Vespertilio velatus Temminck, Mongr. Mamm., II, 1835–41 (1838), 240, pl. ix, fig. 3 (Ypanema, Brazil, Natterer's specimen).—Lahille, Congr. cient. Lat. Amer., III, 1899, 173.

Histiotus velatus Gervais, Expéd. du Comte de Castelnau, Zool., 1855, 77, part, *cf.* Peters.—Peters, Monatsb. k. p. Akad. Wiss. Berlin, 1875 (1876), 787, pl., fig. 1, ear.

Vesperugo velatus Dobson, Cat. Chirop., 1878, 188.

Vesperus velatus Burmeister, Desc. phys. Rép. Argent., III, 1889, 101.

This big-eared bat ranges, according to Burmeister (*l. c.*), from southern Brazil to northern Patagonia, where specimens were taken by Mr. Henry Durnford on the Rio Chubut. Mr. Barnum Brown has described to me a specimen (skin) taken at Mr. H. S. Felton's estancia, about twenty miles from the mouth of the Rio Gallegos, which, from the size (spread of wings about 9 inches) and very large ears, seems referable to the present species.

Genus VESPERTILIO Linnæus.

VESPERTILIO MAGELLANICUS Philippi.

Vesperus magellanicus Philippi, Arch. f. Naturg., 1866, i, 113, Straits of Magellan.—Lahille, Congr. cient. Lat. Amer., III, 1899, 173. Southern Patagonia.

Vesperus magellanicus Peters, Monatsb. k. p. Akad. Wissen. Berlin, 1875 (1876), 790, pl., fig. 4 and 5, ear, skull, and dentition, from Philippi's specimen.

Vesperugo magellanicus Dobson, Cat. Chirop., 1878, 190.—Lataste, Act. Soc. scien. du Chili, I, 1892, 90. Straits of Magellan.

Vespertilio capucinus Philippi, Arch. f. Naturg., 1866, i, 114 = *V. magellanicus*, apud Peters, *l. c.*

The only definite locality known for this species for many years was that of the type, Straits of Magellan. In 1892, Lataste (*l. c.*) states that the missionary Doria had informed him that he had a specimen taken at Santa Cruz, Patagonia, and also records a specimen which he had himself examined, captured January 20, 1892, at the hacienda de San Ignacio de Peruchue, in the Province of Bio-Bio, Chili. The Santa Cruz record perhaps requires confirmation.

Genus LASIURUS Gray.

LASIURUS BOREALIS BONARIENSIS (Less. & Garn.).

Vespertilio bonariensis Lesson & Garnot, Voy. Coquille, Zool., I, 1826, 137–139, pl. ii, animal, skull, and teeth. Rio de la Plata.—Allen, Proc. Biol. Soc. Wash., XIII, 165, Oct. 1900; discussion of synonymy; *ibid.*, XIV, 184, Dec., 1901, synonymy of *V. villosissimus* E. Geoffroy.

Atalapha bonaërensis Burmeister, Desc. phys. Rép. Argent., III, 1879, 93. Paraguay, Chili, Patagonia. Emendation of *bonariensis.*

Lasiurus borealis bonariensis Thomas, Ann. & Mag. Nat. Hist. (7), VIII, Nov., 1901, 435, Paraguay; *ibid.*, IX, Apr., 1902, 238, footnote.

Vespertilio blossevillii Anonymous, Férussac's Bull. Sci. Nat. et Geol., VIII, No. 1, 1826, 95. "Hab. Monte-Video." = *V. bonariensis* Less. & Garn.—Allen, Proc. Biol. Soc. Wash., XIII, 165, Oct., 1900, as a synonym of *V. bonariensis.*

Atalapha blossevillei Gervais, Expéd. du Comte de Castelnau, Mamm., 1855, 72, 87, pl. xiv, fig. 2, skull and teeth, from the type specimen.

Burmeister states, under his *Atalapha bonaërensis* (*l. c.*), that he had received this species from Carmen, Patagonia, near the mouth of the Rio Negro—the most southern record I am able to trace for any form of *Lasiurus.*

NOTE ON *Vespertilio villosissimus* GEOFFROY.

Burmeister gives two species of *Atalapha* (= *Lasiurus*) as found in Paraguay and Argentina—one, his *Atalapha villosissima*, as occurring in Paraguay, and avowedly based on Azara and Rengger, evidently mainly on the latter; the other, his *Atalapha bonaërensis*, as found in Argentina, and based on Argentine specimens. He says that the latter is one of the largest and handsomest species found in the Republic of Argentina, and gives its spread of wings as 14 inches, as against 10 to 11 in his *A. villosissima*. This would seem to indicate that his *bonaërensis* could not be a form of the *L. borealis* group, were it not that the "envergure" is inconsistent with the other measurements, thus implying an error.

Mr. Thomas has referred Lesson and Garnot's *bonariensis* to *L. borealis*, as *Lasiurus borealis bonariensis* (Ann. and Mag. Nat. Hist. (7), VIII, Nov., 1901, p. 436), adding: "The Red Bat was not observed by Azara, his *Chauve-souris septième*, the basis of *Vespertilio villosissimus*, Geoff., being clearly a southern representative of the Grey Bat (*Lasiurus cinereus*, P. de Beauv.)."

A few weeks later, in calling attention to the apparent identity of Lesson and Garnot's *Vespertilio bonariensis* (1820) with E. Geoffroy's *Vespertilio villosissimus* (1807), I incidentally said (Proc. Biol. Soc. Wash., XIV, p. 184, Dec. 12, 1901): "That Azara's Chauve-souris septième is not referable to the *Lasiurus cinereus* group, as stated by Mr. Thomas (Ann. and Mag. Nat. Hist. (7), Vol. VIII, Nov., 1901, p. 435), is evident from its small size, which barely equals that of an average example of *L. borealis*." A few months later Mr. Thomas returned to the subject (*ibid.*, IX, April, 1902, p. 238, footnote), as follows: "I can by no means accept Dr. Allen's recent alteration of my identification of Azara's 'Chauve-Souris septième' from the local race of *Lasiurus cinereus* to that of *L. borealis*, a determination I came to after most carefully weighing the claims of the three Paraguayan *Lasiuri* to this doubtful honour. I freely grant that the 'envergure' given by Azara (313 millim.) is a good deal below the corresponding dimension in fresh and well-stretched specimens of *L. cinereus;* but if Azara's specimens were a little dry and stiff, or immature, the discrepancy would easily be made up, while nothing will give any specimen of *L. borealis* an ear-length of 15 millim. . . . But the primary point is the coloration. With such conspicuously different and brilliantly colored bats as *L. cinereus* and *borealis* the first thing that would strike any, and especially any non-technical, observer is the hoary or whitish-washed colour of *cinereus* and the brilliant rufous of *borealis.* Now Azara says 'le poil est . . . d'un brun très-blanchâtre,' an expression perfectly applicable to *cinereus*, hopelessly at variance with the coloration of either *borealis* or *ega*. The colour of the body and the size of the ear appear therefore to me to settle the question, and consequently I still consider Geoffroy's name *villosissimus* to be applicable to the local form of the 'très-blanchâtre' *Lasiurus cinereus*."

This question, in the abstract, is a small matter, and being averse to controversy, I had concluded to accept Mr. Thomas's argument and decision as final, until in compiling the synonymy for the record here given of a Lasiurine bat in Patagonia, it became necessary to examine critically the literature of the subject with a view to determining which of two supposed species of *Lasiurus* (*L. borealis* and *L. cinereus*) was the one represented.

The outcome has been quite different from what was anticipated, for instead of now referring *V. villosissimus* to the genus *Lasiurus* I believe it to be a species of *Dasypterus*, closely allied to *D. ega*, and apparently the earliest name for that group.

The reasons for this conclusion are as follows: The only authors who have described this bat appear to be Azara and Rengger,[1] neither of whom gives any account of the dental formula, and their accounts of the external characters are far from satisfactory. From them we gather: (1) That it was of about the size of *L. borealis*,[2] having an alar expanse of about 317 mm. (2) That it had a rather long, pointed ear,[3] much larger and differently shaped from the ear in *Lasiurus*. (3) The naked edges of the interfemoral membrane,[4] which do not exist in the *L. borealis* group, and are only slightly seen in the *L. cinereus* group. (4) The extreme softness, great length, and the color of the pelage, which does not agree in any respect with that of *L. borealis*, nor very well with that of *L. cinereus*, but does agree in length and softness with the *Dasypterus ega* group.[1] (5) *Villosissimus* also differs from the species of *Lasiurus* in habits. Rengger says it lives in societies, often of many thousand individuals, in the lofts of churches, in hollow trees, and in clefts in rocks. The species of *Lasiurus* do not assemble in large companies, and inhabit woods, clinging head downward from the leaves and smaller branches of trees, and do not resort to cavities in trees or rocks, or to lofts of buildings.

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[1] Rengger cites under his *Vespertilio villosissimus* Geoff.: "Azara's chauve-souris septième."

[2] The measurements given by Azara are: "Longueur, 4 pouces 1 tiers (11 centimètres 2 tiers). Queue, 23 lignes (5 centimètres). Envergure, 11 pouces et demi (31 centimètres)."

Rengger's measurements: "Die Dimensionen dieser Fledermaus sind: 0, 9‴ Länge des Kopfes; 1″ 9‴ Länge des Rumpfes; 1″ 10‴ Länge des Schwanzes; 11″, 0 Flugweite." Adding together head, body and tail would give a total length of 4⅓ pouces, the same as Azara gives; while the "Flugweite" is a half inch less than Azara's "envergure," — a very close agreement.

[3] "L'oreille est comme celle du rat; elle est haute de 7 lignes (1 centimètre et demi)," Azara; "Die Ohren sind etwa zehn Linien lang und fanf Linien breit," Rengger.

[4] "C'est de la meme couleur qu' est la membrane de la queue; cette dernière est velue, excepté dans sa bordure," Azara; "Die Flügelhaut, bei ihrer Verbindung mit dem Rumpfe, die Arme und die Interkruralhaut, die letzteren mit Ausnahme des Randes, sind mit feinen kurzen Härchen besetzt," Rengger.

Mr. Thomas has recorded both *Lasiurus borealis bonariensis* and *Dasypterus ega argentinus* from Central Paraguay; but there appears to be no record for the *L. cinereus* group from this region. Hence, apparently, the first specimens of Azara's Chauve-souris septième seen by any recent naturalist are those from Central Paraguay referred by Mr. Thomas to his *Dasypterus ega argentinus* (Ann. and Mag. Nat. Hist. (7), VIII, Sept., 1901, p. 247; *ibid.*, Nov., 1901, p. 435).[2]

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[1] "Le poil est extrêmement doux, plus long que d'ordinaire, et d'une brun très-blanchâtre," Azara; "Der Pelz dieser Fledermaus is langharrig und weich anzufühlen," Rengger. Hence the appropriateness of the name *villosissimus*.

[2] DASYPTERUS VILLOSISSIMUS.

The synonymy of Azara's "Chauve-souris septième, ou Chauve-souris brun-blanchâtre," if the above hypothesis prove well-founded, will be as follows:

Chauve-souris septième, ou Chauve-souris brun-blanchâtre, Azara, Quad. du Paraguay, II, 1804, 284.
Vespertilio villosissimus E. Geoffroy, Ann. du Mus., VIII, 1807, 204. Based on Azara, as above. — Rengger, Naturg. Saeug. Parag., 1830, 83.
Atalapha villosissimus Burmeister, Desc. phys. Rép. Argent., III, 1879, 95.
Lasiurus villosissimus, Allen, Proc. Biol. Soc. Wash., XIV, Dec., 1901, 184, critical.
Lasiurus cinereus [*villosissimus*] Thomas, Ann. & Mag. Nat. Hist. (7), VIII, Nov., 1901, 435; inferentially; considered as "clearly a southern representative of the Grey Bat (*Lasiurus cinereus* P. de Beauv.)"; *ibid.* (7), IX, Apr., 1902, 238, footnote, reaffirming this opinion.
Dasypterus villosissimus Allen, as above.
Dasypterus ega argentinus Thomas, Ann. & Mag. Nat. Hist. (7), VIII, 1901, 247, 435.

POSTSCRIPT.

Since passing the first fifty pages of this Report for the press I have found that the name *Ctenomys robustus* as used by me (*antea*, pp. 38 *et seq.*) is preoccupied by a *Ctenomys robustus* Philippi (An. del Museo nac. de Chile, Zool., entr. 13, 1896, p. 11, pl. iv, fig. 2, animal, pl. v, fig. 1, skull; Province of Tarapaca, Chile, alt. 1200 m.). Although I have a reference in my bibliographical notes, made in 1901, to Philippi's species, I had quite overlooked the prior use of the name till recently reminded of the lapsus by my friend Mr. Wilfred H. Osgood, of the U. S. Biological Survey. My *Ctenomys robustus* (*nec* Philippi) may therefore be appropriately renamed **Ctenomys osgoodi.**

BIBLIOGRAPHY.

Following are the titles of most of the special works and papers referred to or cited in the foregoing pages. General works are not included, nor are the histories of voyages in which many of the Pinnipedia, and sometimes other species, are mentioned, even in some cases at much length. The more important of these are referred to *passim* in the text or cited in the tables of synonymy. The annotations following the titles have special reference to the bearing of the papers upon the mammals of Patagonia.

Abbott, C. C.

1868 On the Seals of the Falkland Islands, with Notes by P. L. Sclater (P. Z. S., 1868, pp. 189–192).

Notes on *Morunga elephantina*, *Otaria jubata*, *Otaria falklandica*, and *Stenorhynchus leptonyx*. Nomenclature, and comment thereon, by P. L. Sclater.

Albert, F.

1902 Los Pinipedos de Chile (Act. Soc. scient. du Chili, XI, 1902, pp. 215–272).

Descriptions and extended account of the 5 species, known from Chilian waters.

Allen, J. A.

1880 History | of | North American | Pinnipeds | A Monograph of the | Walruses, Sea-Lions, Sea-Bears | and | Seals | of | North America | — | by Joel Asaph Allen | Assistant in the Museum of Comparative Zoölogy at Cambridge | special Collaborator of the Survey | — | Washington | Government Printing Office | 1880 (Miscellaneous Publications — No. 12, U. S. Geological Survey of the Territories. F. V. Hayden, Geologist-in-Charge.) — 8vo, pp. i–xvi, 1–785, 60 text illustrations.

Treats of the classification, synonymy, nomenclature, and technical history of all the species of Pinnipedia (Otariidæ, pp. 187–231, and Phocidæ, pp. 412–557), including those of the southern hemisphere.

1892 A Synopsis of the Pinnipeds, or Seals and Walruses, in Relation to their Commercial History and Products. (Fur Seal Arbitration, Appendix to the Case of the United States before the Tribunal of Arbitration to Convene at Paris, etc., Vol. I, 1892, pp. 367–391).

List of the species of Otariidæ and Phocidæ, with notes on their distribution, and commercial value.

1892 Fur-Seal Hunting in the Southern Hemisphere (Ibid., pp. 393–404).

History of the principal Fur-Seal rookeries in the Southern Hemisphere.

1892 The Alaskan Fur-Seal and Pelagic Sealing (Ibid., pp. 405–410).

1901 New South American Muridæ and a new *Metachirus* (Bull. Am. Mus. Nat. Hist., XIV, 1901, pp. 405–412).

Eligmodontia morgani, sp. nov., p. 409. Also *Phyllotis* [*Eligmodontia griseoflavus*] *chacoensis* from the Chaco boreal of Paraguay, and *Phyllotis* [*Eligmodontia griseoflavus*] *cachinus* from Salta, Argentina (*cf.* Thomas, Ann. & Mag. Nat. Hist. (7), IX, April, 1902, pp. 240, 241).

Allen, J. A.

1901 The proper generic Names of the Viscacha, Chinchillas, and their Allies (Proc. Biol. Soc. Washington, XIV, pp. 181, 182, Dec. 12, 1901).

Viscaccia Schinz, *Chinchilla* Bennett, *Lagidium* Meyen.

1901 Note on the Names of a few South American Mammals (Proc. Biol. Soc. Washington, XIV, pp. 183–185, Dec. 12, 1901).

The specific name of the Patagonia Armadillo shown to be *ciliatus* (*Dasypus ciliatus* Fischer, 1814), and should stand as *Zaëdyus ciliatus* (Fischer).

1902 A Further Note on the Name of the Argentine Viscacha (Proc. Biol. Soc. Washington, XV, Oct. 10, 1902, 196).

The generic name *Viscaccia* Schinz, 1825, is carried back to Oken, and the specific name *chilensis* (*Lepus chilensis* Oken, 1816), is shown to have one year's priority over *maximus* (*Dipus maximus* Desmarest, ex Blainville), so that the Argentine Viscacha should stand as *Viscaccia chilensis* (Oken).

1902 The Generic and Specific Names of Some of the Otariidæ (Bull. Am. Mus. Nat. Hist., XVI, 1902, pp. 111–118).

Phoca jubata Schreber is assigned to the Northern Sea Lion, following the restriction made by Péron in 1816; *Otaria byronia* (Blainville) is shown to be the earliest available name for the Southern Sea Lion (*Otaria jubata* auct.); *Otoes* Fischer, 1817, is shown to be a pure synonym of *Otaria* Péron, 1816.

1902 Mammal names proposed by Oken in his "Lehrbuch der Zoologie" (Bull. Am. Mus. Nat. Hist., XVI, 1902, pp. 373–379).

The generic name *Viscaccia* carried back from Schinz (1825) to Oken (1816), and *chilensis* Oken (1816), shown to have priority over *maximus* Desmarest (1817) for the Viscacha of Azara.

1903 Descriptions of New Rodents from Southern Patagonia, with a note on the genus *Euneomys* Coues, and an Addendum to Article IV, on Siberian Mammals (Bull. Am. Mus. Nat. Hist., XIX, 1903, pp. 185–196).

Ctenomys robustus, *C. sericeus*, *C. colburni*, *Oxymycterus microtis*, *Reithrodon cuniculoides obscurus*, *R. hatcheri*, and *Euneomys petersoni*, spp. et subsp. nov.

Azara, Félix d'.

1801 Essais | sur l'Histoire naturelle | des Quadrupèdes | de la | Province du Paraguay, | Par Don Félix D'Azara, | . . . [= 5 lines, titles] | Ecrits depuis 1783 jusqu'en 1796 (an 4 de la République Française); | Avec une Appendice sur quelques Reptiles, | Et formant suite nécessaire aux Oeuvres de Buffon. | Traduits sur le Manuscrit inédit de l'Auteur, | Par M. L. E. Moreau-Saint-Méry, | . . . [= 6 lines, titles. | — | Tome Premier [Second]. | Paris, | Charles Pougens, quai Voltaire, N° 10. | — | An IX (1801). 2 vols., 8vo. Tom. I, half-title, pp. i–lxxx + 1–366; Tom. II, half-title, title page, and pp. 5–499.

An important work bearing on the mammalian fauna of Patagonia. Azara's excellent descriptions are in many instances the sole basis of names imposed by later systematists.

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Barrett-Hamilton, G. E. H.

1901 [Report on Antarctic Seals] (Antarctic Manual for 1901, pp. 209–224).

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Brief mention of 4 spp. of Phocidæ.

1902 [Antarctic] Mammalia (Report on the Collections of Natural History made in the Antaractic Regions during the Voyage of the "Southern Cross," 1902, pp. 1–66, pl. i, and 6 half-tone illustrations).

Detailed synonymy, descriptions, measurements, etc., of *Leptonychotes weddellii* (pp. 17–23), *Ogmorhinus leptonyx* (pp. 23–34), *Lobodon carcinophagus* (pp. 35–45), *Ommatophoca rossii* (pp. 46–66, pl. i, dentition), with half-tone illustrations of animals from photographs from life.

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Beddard, Frank E.

1890 On the Structure of Hooker's Sea-Lion (*Arctocephalus hookeri*) (Trans. Zoöl. Soc. London, XII, Part X, No. 4, April, 1890, pp. 369–380, pll. lxiv and lxv, and 7 text figures).

External characters, visceral anatomy and osteology of Hooker's Sea Lion. Figures of head and muzzle of this species in comparison with those of *Zalophus*, *Otaria* and *Arctocephalus*, all from living specimens in the Garden of the Zoölogical Society.

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Lagotis pallipes sp. nov.

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Ctenomys magellanicus, *Kerodon kingii*, *Cavia cutleri* and *Mus magellanicus* spp. nov.

Berg, C.

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Record of two specimens taken in the Rio de la Plata, near Buenos Aires.

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Blainville, H. D. de.

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Describes (p. 387) "1°. Sea Lion from the island of Tinian by Commodor Byron," which is named "*P*[*hoca*] *byronia?*" on p. 300. *P*[*hoca*] *coronata*, sp. nov. (p. 295), is based on a young mounted eared seal in Bullock's Museum, London, black, with a yellow band on the head, etc. *P*[*hoca*] *leptonyx*, sp. nov., p. 298; "*Ph. ansonina*" is proposed as a provisional name on p. 299, and repeated as "*P. ansonii*" on p. 300.

A brief review of the Seals is given (pp. 290–296), which are divided into "A. Les Phoques sans oreilles," and "B. Les Phoques à orielles." They are later grouped into five sections, A–E, on the basis of cranial characters and dentition. Altogether some 16 species are recognized.

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References to a number of Patagonian species.

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Canis gracilis Burm., in reply to Philippi, R. A., 1860, *q. v.*

1879 Description physique | de la | République Argentine | d'après des observations personelles et étrangères | par | le Dr. H. Burmeister | . . . [3 lines, titles | traduite de l'Allemand avec le concours de | E. Daireaux | . . . | Tome Troisième | Animaux Vertébrés | Première Partie | Mammifères vivants et éteints | Avec Atlas | Buénos-Ayres | Imprimerie de Paul-Émile Coni, Rue Alsina, 60 | Paris | F. Savy | Halle | Ed. Anton | En Commission |1879 | Tous droits réservés — 8vo, pp. vi + 556.

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Western Patagonia, from Mendoza southward. Its external characters and dentition.

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Pl. viii, figs. 1–14 + 6*a* and 13*a*, *Otaria jubata*. Skulls of adult males and females, young male (× $\frac{2}{5}$), and a fœtal skull (× $\frac{2}{3}$); also teeth of young male and of a fœtal skull (× $\frac{1}{1}$). Pl. x, figs. 1–11 + 9*a* and 10*b*. Animal × $\frac{1}{6}$, adult ♂ skull, 3 views, × $\frac{1}{2}$; a young skull, 3 views, × $\frac{2}{3}$; teeth of adult, × $\frac{1}{1}$; osteology of fore and hind limb and hyoid, × $\frac{1}{1}$.

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Cunningham, Robert O.

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Cunningham, Robert O.

With Map and Illustrations | Edinburgh | Edmonston and Douglas | 1871 | All rights reserved — 8vo, pp. i–xviii + 1–517, map, 22 pll.

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Cunningham, J. T.

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Macrorhinus leoninus figured, pp. 67, 68.

Dabbene, A.

1902 Fauna Magallánica, — Mamíferos y Aves de la Tierra del Fuego (An. Mus. Buenos Aires (3), I, 1902, pp. 341–409).

Mammals, pp. 348–351.

Distant, W. L.

1899 The Sea Elephant (*Macrorhinus elephantinus*) (Zoölogist (4), III, Sept., 1899, pp. 385–387, pl. iii).

The plate is from a photograph of a specimen killed at the Falkland Islands. Also measurements are given in a letter, from James Smith, here reproduced, regarding the present rarity of the animal at these islands, and measurements of another (?) specimen killed at Stanley Harbor, Falkland Islands.

Elliot, D. G.

1872 On *Felis pardinoides*, J. E. Gray (P. Z. S., 1872, 203).

Felis pardinoides and *F. warwickii* Gray, both referred to *Felis geoffroyi* D'Orb.

Flower, William Henry.

1831. On the Elephant Seal, *Macrorhinus leoninus* (Linn.) (P. Z. S., 1881, pp. 145–162. with text figures).

Detailed description of skull, dentition (including milk dentition), auditory ossicles, and discussion of systematic position and affinities.

1884 Catalogue of the Specimens | illustrating the | Osteology and Dentition | of | Vertebrated Animals, | Recent and Extinct, | contained in | the Museum | of | the Royal College of Surgeons of England. | Part II. | Class Mammalia, other than Man. | By | William Henry Flower, LL.D., F. R. S., | Conservator of the Museum. | Assisted by | John George Garson, M.D., | Assistant in the Museum. | — | London: | Printed for the College; | and sold by | J. & A. Churchill, 11 New Burlington Street. | MDCCCLXXXIV. — 8vo, pp. xliii + 779.

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Gay [Claude], et Paul Gervais.

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Gibson, E.

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Spp. nov.: *Vulpes magellanica*, *V. griseus*, p. 578, Straits of Magellan; *Lutra californica*, p. 580, "California" (= Patagonia?); *Conepatus* (gen. nov.) *humboldtii*, p. 581, Straits of Magellan; *Marputius* (gen. nov.), p. 581, Chili; *Leptonyx* (gen. nov.) *weddellii*, p. 582, "South Seas"; *Lepus longicaudatus*, p. 586, "Magellan Land" (= South Africa, Waterhouse).

1844–1846 Mammalia of the Zoölogy of the Voyage of the Erebus and Terror. 1844–1846. Title page not seen. See Gray, J. E., 1875.

"The Seals of the Southern Hemisphere," pp. 1–8, pll. i–x (résumé of the literature, pp. 1, 2); "Synopsis of the Species of Seals," pp. 2–5; "Description of the Seals of the Southern Hemisphere," pp. 5–8 (incomplete). *Lobodon* (p. 5) and *Ommatophoca* (p. 7), gen. nov.

Figures: *Lobodon carcinophaga*, pl. i, animal, pl. ii, skull; *Stenorhnychus leptonyx*, pl. iii, animal, pl. iv, skull; *Loptonyx weddellii*, pl. v, animal, pl. vi, skull; *Ommatophoca rossii*, pl. vii, animal, pl. viii, skull; *Morunga elephantina*, pl. ix, animal (female), pl. x, skull; *Lobodon carcinophaga*, pl. xi, skull; *Arctocephalus hookeri*, pl. xiv, animal, pl. xv, skull; *Arctocephalus lobatus*, pl. xvi, animal, pl. xvii, figs. 3–5, skull; *Otaria jubata*, juv., pl. xvii, figs. 1, 2, skull. Plates xii and xiii are lacking. Plates i–xii, 1844; pll. xiii–xvii of later date.

In the copy examined the text terminates abruptly in the middle of a sentence at the end of p. 8. It contains, however, plates ix–xvii, completing the series of seal plates, and pll. xviii–xxv of the miscellaneous mammals, pll. i–xxx of the Cetacea, and pll. i*–xxv of the birds, or the complete series of bird plates, except pll. i, vii, xii, xx*, and xxii.

See the 1875 ed., with complete text and plates.

"Sir James Ross's expedition obtained specimens of each of the four species [of Antarctic Seals], and accordingly Gray's work became, and still remains, the standard description of them all. It contains in fact the first written description of the Crab-eating Seal and of Ross's Seal, and the first intelligible description of Weddell's Seal." — Barrett-Hamilton, Report on Southern Cross Collections, 1902, p. 2.

1850 Catalogue | of the specimens of | Mammalia | in | the Collection | of the | British Museum. | Part II. | Seals. | London: | Printed by order of the Trustees. | 1850.—12mo, pp. viii + 48, text figs. 1–16.

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Capreolus leucotis, sp. nov. = *Hippocamelus bisulcus* (Mol.).

1850 Synopsis of the species of Deer (Cervina), with the description of a new species in the Gardens of the Society (P. Z. S., 1850, pp. 222–242, pl. xxii–xxviii).

Furcifer antisiensis and *F. huamel*, p. 236.

Gray, J. E.

1865 Revision of the Genera and Species of Mustelidæ contained in the British Museum (P. Z. S., 1865, pp. 100–154, pl. vii).

The species of Gray's genus *Nutria*, pp. 128, 129.

1866 Notes on the skulls of Sea Bears and Sea-Lions (Otariadæ) in the British Museum (Ann. & Mag. Nat. Hist. (3), XVIII, Sept., 1866, pp. 228–237).

Important historical and critical comment on the Falkland Island species.

1866 Catalogue | of | Seals and Whales | in the | British Museum. | By | John Edward Gray, F.R.S., V.P.Z.S., F.L.S., &c. | Second Edition. | London: | Printed by order of the Trustees. | 1866.— 8vo, pp. viii + 402, 101 text figures.

Pinnipedia, pp. 1–60, figs. 1–18.

1867 Notes on the Skulls of the Cats (Felidæ) (P. Z. S., 1867, pp. 258–277).

Systematic review of the family. *Pajeros*, gen. nov., for *Felis pajeros* Desm.

1867 Notes on certain species of Cats in the Collection of the British Museum (P. Z. S., 1867, pp. 394–405, pll. xxiv, xxv).

Contains critical comment on various South American species, with a redescription and colored plate of *Pardalina warwickii.*

1868 Observations on Sea-Bears (Otariadæ), and especially on the Fur-Seals and Hair-Seals of the Falkland Islands and Southern America (Ann. & Mag. Nat. Hist. (4), I, Feb., 1868, pp. 99–110).

Valuable historical comment on the various specimens previously received, or reputed to have come, from the Falkland Islands. Three species are recognized: (1) *Arctocephalus falklandicus*, (2) *Euotaria nigrescens*, and (3) *Phocarctos hookeri.*

1869 A New Deer from Chili (Scientific Opinion, Oct. 6, 1869, p. 385).

Anomalocera huamel, gen. et sp. nov., = *Hippocamelus bisulcus* (Mol.).

1869 On the Guemel, or Roebuck of Southern Peru (P. Z. S., 1869, pp. 496–499, text cuts of antlers and skull).

Xenelaphus huamel, gen. et sp. nov., = *Hippocamelus bisulcus* (Mol.).

1871 Supplement | to the | Catalogue | of | Seals and Whales | in the | British Museum. | By | John Edward Gray, F.R.S., F.L.S., &c. | London: | Printed by order of the Trustees. | 1871.— 8vo, pp. vi + 103, 11 text figures.

Pinnipedia, pp. 1–33. Otariidæ, 13 spp., of which five are South American.

1872 The Ears of Sea-lions and Sea-bears (Ann. & Mag. Nat. Hist. (4), IX, June, 1872, p. 483).

A short note on the size of the ears in *Otaria jubata* (= *O. byronii*) and *Arctocephalus antarcticus*, from living specimens in the London Zoölogical Gardens.

1872 On the Guémul (*Huamela leucotis*) (Ann. & Mag. Nat. Hist. (4), X, Dec., 1872, pp. 445, 446).

Genus *Huamela*, type *Capreolus leucotis* Gray; *Xenelaphus leucotis* Gray is renamed *Xenelaphus anomalocera.*

1873 Further Remarks on the Guémul of Patagonia (*Huamela leucotis*) (Ann. & Mag. Nat. Hist. (4), XI, March, 1873, pp. 214–220, fig. of skull, p. 218).

Huamela, gen. char., p. 217; characters and history of *H. leucotis* (Guémul), and *Xenelaphus anomalocera*, sp. nov.

1874 Notes on the Skulls of two undescribed Sea-lions (*Otaria*), (Ann. & Mag. Nat. Hist. (4), XIII, April, 1874, pp. 325, 326).

Gray, J. E.

Spp. nov., *Otaria minor* and *O. pygmæa*, both from unknown localities (= *Otaria byronia*).

1874 On *Xenelaphus*, *Furcifer*, and *Coassus peruvianus* (Ann. & Mag. Nat. Hist. (4), XIII, April, 1874, pp. 331, 332).

1874 Handlist of Seals, Morses, Sea-Lions, and Sea-Bears in the British Museum. London, 1874. 8vo, pp. 43, pll. i–xxx.

"Similar to the author's previous catalogues." Not seen; from Zoöl. Record, 1874.

1875[1] The | Zoology | of the | Voyage of H.M.S. Erebus & Terror, | Under the Command of Captain Sir James Clark Ross, R.N., F.R.S., | During the years | 1839 to 1843. | By Authority of the Lords Commissioners of the Admirality. | Edited by | John Richardson, M.D., F.R.S., &c. | and | John Edward Gray, Esq., Ph.D., F.R.S., &c. | [. . .] Vol. I. | Mammalia, Birds. | [. . .] London: | E. W. Janson, 28, Museum Street, W. C. | M.DCCC.XLIV.–M.DCCC.LXXV. [4°]

VOL. I.

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Seals, I–X, XIV–XVII. Miscellanea, XVIII–XXII, XXV–XXIX. Cetacea, *Balæna antipodarum* (referred to at p. 16 as *B. antarctica*), I–XXXII bis, XXXIII–XXXVII. Birds, I, I *, II–XI, XI *, XIII–XX, XX *, XXI *, XXI, XXIII–XXXV. [No birds in copy examined.]

Hagmann, G.

1901 Kritische Bemerkungen zur Systematik der Amazonischen Füchse. < Zool. Anz., XXIV, 1901, pp. 509–514.

Individual variation in premolars and in other characters.

Hall, Robert.

1900 Sea-Elephants on Kerguelen's Land (Zoologist (4), IV, Oct., 1900, pp. 441–447).

Measurements, weight, habits, numbers, and method of killing them on Kerguelen Land, with cut (from a photograph) of a disturbed herd.

Hamilton, R.

1838 Observations on the Fur Seal (Ann. Nat. Hist., II, Oct., 1838, pp. 81–95, pl. iv).

General account of "the Fur Seal of commerce," named on the plate *Otaria falkandica*, and relating mainly to this species. Of much historical interest, and contains a good description of the specimens obtained by Capt. Weddell at the Falkland Islands and presented by him to the Museum of the University of Edinburgh.

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[1] This work not being at hand at present, I am indebted to Dr. T. S. Palmer for the transcript, here presented, of the title page and contents. See Gray, J. E., 1844–1846, for synopsis of text and collation of plates of Pinnipedia.

Hanson, Nicolai.

1902 Extracts from the private Diary of the late Nicolai Hanson (Report Nat. Hist. Collections of the "Southern Cross," 1902, pp. 79–105), several half-tone illustrations.

Field notes, referring in part to seals, by the zoölogist of the *Southern Cross* Expedition; a half-tone cut of Ross's Seal, p. 96.

Hensel, R.

1872 Beiträge zur Kenntniss der Säugethiere Süd-Brasiliens (Abh. K. Akad. der Wissen. zu Berlin, 1872, pp. 1–130, pll. i–iii).

Includes references to a number of Patagonian species.

Heller, Edmund.

1904 Mammals of the Galapagos Archipelago, exclusive of the Cetacea (Proc. California Acad. Sci. (3), Zoöl., III, No. 7, pp. 233–250, pl. xxiii).

Otariidæ, pp. 243–248. *Arctocephalus galapagoensis*, sp. nov., p. 245.

Hudson, W. H.

1872 On the Habits of the Vizcacha (*Lagostomus trichodactylus*) (P. Z. S., 1872, pp. 822–833).

A detailed account of its habits and mode of life, based on the personal observations of the author on the pampas of Buenos Ayres.

Lahille, F.

1899 Ensayo sobre la distribución geográfica de los mamiferos de la Republica Argentina (Congr. Cien. Lat. Amer., III, 1899, pp. 165–206, with map).

Discussion of the faunal areas of Patagonia, with a map giving their boundaries, together with a list of the Mammals of Patagonia; their distribution indicated by use of the names of the faunal "provinces" here established.

Lesson, R.-P.

1826 Sur le Phoque léopard de mer (Sea Leopard) des Orcades australes; par James Weddell. (Férussac's Bull. des Sci. Nat. et de Géol., VII, 1826, 437, 438).

Otaria weddellii, sp. nov.

Lydekker, R.

1899 Specific Characters of the Chilean Guemal (P. Z. S., 1899, pp. 917–919, pl. lx), and text cut of head of adult male.

Colored plate of an adult male from Patagonia; text cut of head of a male from Ultima Esperanza, Patagonia.

Martin, William.

1837 Observations on three specimens of the genus *Felis* presented to the Society by Charles Darwin, Esq. (P. Z. S., 1837, pp. 3, 4).

Felis darwini, sp. nov., provisional name.

Matschie, P.

1894 Die von P. Neumann in Argentinien gesammelten und beobacteten Säugethiere (Sitzunsb. Ges. nat. Freunde Berlin, 1894, 56–74).

Forty-four spp. from southern Argentina and Tucuman.

Matschie, P.

1894 [Ueber *Cariacus peruvianus.*] Mittheil. Nat. Mus. Lubeck (2) (i, 1894, 129). (Not seen.)

1895 Ueber *Lyncodon patagonicum* (Sitzunsb. Ges. nat. Freunde Berlin, 1895, pp. 171–177).

1898 Hamburger Magalhænsische Sammelreise, Säugethiere. Hamburg, 1898, pp. 29, pl. 1.

Hesperomys (*Acodon*) *michaelseni*, sp. nov., p. 5, pl. i. Southern Patagonia.

Milne-Edwards, A.

1890 Mission Scientifique du Cap Horn, 1882–1883, Vol. VI, Zoologie. Mammifères, pp. 32, pll. 8.

Sixteen species, of which 8 are figured.

Merriam, C. Hart.

1897 A New Fur Seal or Sea-Bear (*Arctocephalus townsendi*) from Guadalupe Island, off Lower California (Proc. Biol. Soc. Washington, XI, 1897, pp. 175–178, July 1, 1897).

Description of the species and historical account of the known occurrence of Fur Seals at Guadalupe Island.

1901 Preliminary Revision of the Pumas (*Felis concolor* group) (Proc. Washington Acad. Sci., III, 1901, pp. 577–600).

Felis puma patagonica, subsp. nov., eastern base of Andes, Patagonia.

1902. Six new Skunks of the genus *Conepatus* (Proc. Biol. Soc. Washington, XV, pp. 161–165).

Conepatus humboldti, Patagonia, referred to incidentally, p. 165.

Mivart, St. George.

1881 The Cat. | An Introduction to the Study | of | Back-boned Animals | especially | Mammals. | By St. George Mivart, Ph.D., F.R.S. | With 200 illustrations. | London: | John Murray, Albemarle Street. | 1881. | [All Rights reserved.] — 8vo, pp. i–xxiv + 1–557, frontispiece, and 209 text-figures.

Under "Chapter XII., Different Kinds of Cats," the South American small spotted cats are treated, pp. 408–413; *Felis concolor* and *F. onca*, p. 397.

1890 Notes on the South American Canidæ (P. Z. S., 1890, pp. 98–113, figs. 1–8).

A review of the literature and of the species. Five species and 10 "varieties" recognized; *Canis parvidens* and *C. urostictus*, spp. nov.

1890 Dogs, Jackals, Wolves, and Foxes: | A | Monograph | of | the Canidæ. | By | St. George Mivart, F.R.S. | — | With woodcuts, and 45 coloured plates | drawn from nature by J. G. Keulemans and hand-coloured. | — | London: | R. H. Porter, 18 Princes Street, Cavendish Square, W., | and | Dulau & Co., 37 Soho Square, W. | 1890. — Roy. 8vo, pp. i–xxviii + 1–216, pll. col. i–xiv, text-figs. 1–59.

South American species, pp. 52–84, pll. xiv–xix, text-figs. 21–33.

Moseley, H. N.

1879 Notes by a Naturalist on the "Challenger," being an account of various observations made during the Voyage of H.M.S. "Challenger" round the World, in the years 1872–1876, under the Commands of Sir G. S. Nares, R.N., K.C.B., F.R.S., and Capt. F. T. Thompson. By H. N. Mosely, M.A., F.R.S., etc. With a Map, two coloured Plates, and numerous Woodcuts. London: Macmillan and Co. 1879. — 8vo, pp. xvi + 606.

Moseley, H. N.

Contains interesting notes on the Sea-Elephant as observed at Kerguelen Land, with copies of Anson's Sea Lion and Leseur's plate of Sea Elephants, pp. 200–206; Sea Elephant hunting and habits of Sea Elephants at Heard Island, pp. 227–229.

1892 Notes by a Naturalist. | An Account of Observations | made during | the Voyage of H.M.S. "Challenger" | round the World in the Years 1872–1876. | Under the Command of | Capt. Sir G. S. Nares, R.N., K.C.B., F.R.S., and | Capt. F. T. Thompson, R.N. | By H. N. Mosely, M.A., F.R.S., | late Fellow of Exeter College, Oxford. | A new and revised edition, with map, portrait, and woodcuts, | and a brief memoir of the Author. | New York: G. P. Putnam's Sons | London: John Murray | 1892. — 8vo, pp. xxiv + 540, with portrait, map, and numerous text-cuts.

Sea Elephants, pp. 98, 148, 174–178; Fur Seals, pp. 110, 164, 177, 179, 229, 517; Sea Leopard, p. 174. The text and illustrations are apparently the same as in the 1879 edition, *q. v.*

Müller, J.

1841 See Nilsson, 1841.

Murie, James.

1867 On the Cause of Death of the Sea-Bear (*Otaria hookeri*), lately living in the Society's Gardens (P. Z. S., 1867, pp. 243, 244).

Otaria hookeri (= *Otaria jubata* auct.) captured near Cape Horn, June, 1862.

1869 Report on the Eared Seals collected by the Society's Keeper François Lecomte in the Falkland Islands (P. Z. S., 1869, pp. 100–109, pl. vii.)

Account of external and cranial characters of *Otaria jubata*, with a colored plate of the animal, and text cuts of male and female skulls, from below, $\frac{1}{3}$ natural size, and of the "Habits and Economy of the Eared Seals."

1872 Researches upon the Anatomy of the Pinnipedia. — Parts II–III. Descriptive Anatomy of the Sea-lion (*Otaria jubata*) (Trans. Zoöl. Soc. London, VII, pt. xvi, Jan., 1872, pp. 527–596, pll. lxvii–lxxii; VIII, pt. xvi, June, 1874, pp. 501–582, pll. lxxv–lxxxii).

Detailed account of the anatomy of a specimen of *Otaria jubata* auct. from the Falkland Islands (*Cf.* Sclater, P. L., 1866, and Murie, J., 1867).

Nehring, A.

1885 Ueber das Geweih eines *Furcifer chilensis* aus Süd-Patagonien (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 10, Dec., 1885, pp. 188–190).

Comparison of the antlers of *Furcifer chilensis* and *F. antisiensis*, with table of comparative measurements.

1886 Ueber *Furcifer antisiensis* (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 1, Jan., 1886, pp. 17, 18).

Further comparison with *F. chilensis*.

1886 Ueber *Lutra brasiliensis*, *Lutra paranensis*, *Galictis crassidens*, und *Galera macrodon* (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 10, Dec., 1886, pp. 144–152).

1887 Uber die Gray'schen Fischotter-Gattungen *Lutronectes*, *Lontra* und *Pteronura* (Sitzungsb. Gesells. naturf. Freunde zu Berlin, 1887, No. 3, May, 1887, pp. 20–25).

Lutra latifrons, nom. nov., for Gray's three species of *Lontra*.

1887 Ueber eine Pelzrobben Art von der Küste Süd-Brasiliens (Arch. f. Naturg., 1887, i, pp. 75–94, pl. ii), skull and dentition.

Nehring, A.

Arctocephalus (*Arctophoca*) *gracilis* sp. nov., from coast of Brazil, lat. 29° 59′ S., near mouth of Tramandahý River.

1887 Einige Notizen über die südbrasilianische Pelzrobbe (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 8, Oct., 1887, pp. 142, 143).

Supplementary to the preceding paper.

1887 Ueber eine Pelzrobbe von Rio de Janeiro (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 10, Dec., 1887, pp. 207, 208).

Reported capture, on the authority of Dr. Gölde, of a Fur Seal at Ponta Negra, near Rio de Janeiro, Brazil, referred by both Dr. Gölde and Dr. Nehring, to "*Arctophoca falclandica* Burmeister."

1900 Ueber *Lutra* (*Pteronura*) *paranensis* Rengger, und ein lebendes Weibchen dieser Art (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 10, Dec., 1900, pp. 221–228).

1900 Ueber *Ctenomys pundti* n. sp., und *Ct. minutus* Nhrg. (Zool. Anz., XXIII, 1900, pp. 420–423, figs. 1, 2), top view of skulls of *Ct. pundti* and *Ct. minutus*.

1900 Ueber *Ctenomys neglectus* n. sp., *Ct. nattereri* Wagn. und *Ct. lutjanensis* Amegh. (Zool. Anz., XXIII, Oct., 1900, pp. 535–541, figs. 1–3).

Ctenomys neglectus, sp. nov. (p. 535, fig. 1, skull), based on a weathered skull from Patagonia.

1900 Ueber die Schädel von *Ctenomys minutus* Nhrg., *Ct. torquatus* Licht. und *Ct. pundti* Nhrg. (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 9, Nov., 1900, pp. 201–210), mit 7 figs.

1901 Einige Notizen über die *Lutra* (*Pteronura*) *paranensis* des hiesigen zoologischen Gartens (Sitzungsb. Gesells. naturf. Freunde zu Berlin, No. 3, März, 1901, pp. 133–135).

Nilsson, S.

1837 Utkast till en systematisk indelning af Phocacierna (K. Vet. Akad. Handl. Stockholm, LVIII, 1837, pp. 235–240).

Not now accessible; see the German translation, Nilsson, 1841.

1841 Entwurf einer systematischen Eintheilung und speciellen Beschreibung der Phoken, von Nilsson. Aus dem Schwedischen übersetzt von Dr. W. Peters (Arch. f. Naturg. 1841, i, pp. 301–334).

An important revision of the subject with remarks (in footnotes) and a supplement by J. Müller.

Owen, Richard.

1843 Notice of a new species of Seal (*Stenorhynchus serridens*) (Ann. & Mag. Nat. Hist., XII, Nov., 1843, pp. 331, 332).

= *Lobodon carcinophaga* (Jacq. & Puch.).

Peters, W.

1866 Ueber die Ohrenrobben (Seelöwen und Seebären), *Otariæ*, inbesondere über die in den Sammlungen zu Berlin befindlichen Arten. (Monatsb. K. Akad. zu Berlin, 1866, pp. 261–281, pll. i, ii, ii*b*, ii*c*).

A general review of the group, of which 14 species, all placed in *Otaria*, are indicated, of which 3 appear to be considered doubtful. *Phocarctos* (p. 269) and *Arctophoca* (p. 276) proposed as new subgenera; *Otaria godeffroyi*, sp. nov. (p. 266, pl. i), based on an old male skull, from Chincha Islands, Peru; *Otaria philippii*, sp. nov. (p. 276, pll. ii*a*, ii*b*, ii*c*), based on a skull from Juan Fernandez Island.

Peters, W.

1866 Nachtrag zu seiner Abhandlungen über die Ohrenrobben (*Otariæ*) (Monatsb. K. Akad. zu Berlin, 1866, pp. 665–672, with plate).

Further comment, the species here apparently reduced to 10. The skull of *Otaria ulloæ* figured. A synopsis of the species (pp. 670–672), which are placed in 7 subgenera.

1871 Ueber die Verschiedenheit der in dem atlantischen und stillen Ocean vorkommenden Pelzrobben (Monatsb. K. Akad. zu Berlin, 1871, pp. 563–566).

Otaria argentata Philippi is thought to be the female of *O. philippii* Peters, and *Otaria falklandica* (Shaw) the female of *O. nigrescens* Gray; refers to the great similarity between *O. philippii* and *O. nigrescens* and raises the question of their specific distinctness.

1876 Ueber die mit *Histiotus velatus* verwandten Flederthiere aus Chile (Monatsb. K. Akad. zu Berlin, 1875 (1876), pp. 785–782, with pl.)

Vesperus (*Histiotus*) *velatus* I. Geoffroy, *Vesperus* (*H.*) *macrotus* Pöppig, and *Vesperus montanus* Philippi discussed at length; ear, head, skull, and dentition figured.

1877 Ueber die Ohrenrobben, *Otaria*, als Nachtrag zu seiner im vorigen Jahre über diese Thiere gelesenen Abhandlung. (Monatsb. K. P. Akad. Wissen. zu Berlin, 1877, pp. 505–507).

Supplement to a paper of the previous year on Eared Seals, read before the Academy June 12, 1876, but apparently not published (*cf. op. cit.*, 1876, p. 327). Systematic list of genera and species, with annotations; 3 genera, 13 species.

Philippi, R. A.

1866 Ueber ein paar neue Chilenische Säugethiere (Arch. f. Naturg., 1866, pt. i, pp. 113–117).

Vespertilio magellanicus, p. 113, Straits of Magellan; *Canis patagonicus*, p. 116, Straits of Magellan.

1870 Eine vermeintliche neue Hirschart aus Chile (Arch. f. Naturg., 1870, i, pp. 46–49).

Comment on *Anomolocera leucotis* Gray, doubting especially its alleged Chilian habitat.

1871 Ueber eine für Chile neue Art von *Otaria* (Monatsb. K. Akad. zu Berlin, 1871, pp. 558–562, pll. 2).

Otaria argentata, sp. nov. (p. 560, text, and pll. i and ii, skull), from Mas a Fuera.

1873 Ueber *Felis Guiña* Molina und über die Schädelbildung bei *Felis Pajeros* und *Felis Colocolo* (Arch. f. Naturg., 1873, i, pp. 8–15, pll. ii, iii).

Pl. iii, fig. 3 and 4, skull of *Felis pajeros*.

1892 Las Focas Chilenas del Museo Nacional (An. Mus. Nac. Chile, 1892, Zool., Ent., I, pp. 1–52, pll. i–xxiii).

Otaria jubata, p. 9, pl. i, animal; *O. ulloæ*, p. 12, pl. vi, animal; *O. velutina*, sp. nov., p. 14, pll. vi, vii (skull), viii, animal (*O. ulloæ* on plates); *O. fulva*, sp. nov., p. 17, pll. ii, animal, iii–v, skull; *O. molossina*, p. 22, pl. ix, animal, x, skull of very young specimen; *O. chilensis*, p. 25, pll. xi, animal, xii, skull, young with milk dentition; *O. rufa*, sp. nov., p. 28, pl. xiii, animal; *O. philippii*, p. 33, pll. xiv, xv, animal, xvi–xix, skulls; *O. argentata?*, p. 38, pl. xx; *O. australis*, p. 40, pll. xi, animal, xxi, skull, young — "*O. falklandica*" on plates; *O. brachydactyla*, sp. nov., p. 43, pll. xiii, xxii, skull with milk dentition; *O. leucostoma*, sp. nov., p. 46, pl. xxiii, animal; *O. aurita*, p. 47, from

Philippi, R. A.

Tschudi. *O. chonotica*, p. 49, is a provisional name, suggested by Matschie, for *O. chilensis* Müller.

1892 El Guemel de Chile (An. Mus. Nac. Chile, 1892, pp. 1–9 with plate).

On the Taruga (*Cervus antisiensis*) and the Guemul (*C. chilensis*); chiefly historical.

1894 *Cervus antisiensis*, *chilensis*, *brachyceros* (An. Mus. Nac. Chile, Zool., Entr. 7, 1894, pp. 1–16, pll. i–iv).

Synonymy and descriptions, with figures of the animals and skulls, and critical comparison of the species. *Cervus brachyceros* evidently based on malformed antlers of *C. antisiensis*.

1896 Descripcion de los Mamíferos triados del viaje de esploracion a Tarapacá, hecho por órden del Gobierno en el Verandode, 1884 a 1885 (An. Mus. Nac. Chile, 1899, Zool., Entr. 13, pp. 1–24, pll. i–vii).

Vespertilio atacamensis (p. 5), *Lagidium lutescens* (p. 8), four species of *Ctenomys*, and five species of "*Hesperomys*" described as new, and all figured.

1900 Figuras y descripciones de los Murideos de Chile (An. Mus. Nac. Chile, Zool., Entr. 14ª, pp. 1–70, pll. i–xxv).

A large number of species of "*Mus*" described and figured as new.

1901 Neuva especie Chilena de Zorras (An. Univ. Chile, Feb., 1901, pp. 167–170, 1 pl.).

Canis domeykoanus, sp. nov., Island of Chiloe.

1903 Einige neue Chilenische *Canis*-Art. (Arch. f. Nat., 1903, i, pp. 155–169).

Canis amblydon, *C. maullinicus*, *C. trichodactylus*, *C. albigula*, *C. torquatus*, spp. nov.!

Prichard, H. H.

1902 Field-Notes on the larger Mammals of Patagonia (P. Z. S., 1902, I, pp. 272–277).

Notes on the Huemul, Guanaco, Puma, Pearson's Puma, Patagonian Cavy, and Little Armadillo.

1902 Through the Heart | of Patagonia | By | H. Hesketh Prichard | F.R.G.S., F.Z.S. | Fellow of the Anthropological Institute; author of | "Where Black rules White: A Journey | across and about Hayti" | With illustrations from drawings in colour | and black and white by | John Guille Millais, F.Z.S. | and from photographs | New York | D. Appleton & Company | 1902 — Imp. 8vo, pp. i–xvi + 1–346, with 39 full-page colored and plain illustrations, 87 text figures, and 3 maps. Chap. XVII (pp. 235–246), "On the first Attitude of Wild Animals towards Man"; Chap. XVIII (pp. 247–260), "The larger Mammals of Patagonia,"— nine species formally treated. Also many references *passim* to the same species, and a reprint of "On a New Form of Puma from Patagonia" by Oldfield Thomas, pp. 334, 335. Many important illustrations from photographs, including skulls of Huemul, and colored plates of the Huemul in summer coat, the Cordillera Wolf, and Pearson's Puma.

Rengger, J. R.

1830 Naturgeschichte | der | Saeugethiere | von | Paraguay, | von | Dr. J. R. Rengger. | — Basel, | in der Schweighauserschen Buchhandlung | 1830. — 8vo, pp. i–xvi + 1–394.

Saint-Loup, Rémy.

1895 Notes sur l'anatomie du Mara (*Dolichotis patagonica* Desm.) (Bull. Mus. d'Hist. Nat. Paris, I, 1895, pp. 143–145).

Saint-Loup, Rémy.

1898 Une bonne espèce, á propos du *Dolichotis salinicola* (Burm.) (Comun. Mus. Buenos Aires, I, 1898, p. 43).

Sclater, P. L.

1866 [A young living "male Sea-Bear (*Otaria hookeri*" = *Otaria jubata* auct.) captured near Cape Horn, June, 1862] (P. Z. S., 1866, p. 80).

Afterwards the basis of Murie's memoir on the anatomy of this species. *Cf.* Murie, 1872–1874.

1868 [A young living female Sea-Lion (*Otaria jubata*), from the Falkland Islands, etc.] (P. Z. S., 1868, pp. 527–529).

1873 Remarks on *Cervus chilensis* and *Cervus antisiensis* (Ann. & Mag. Nat. Hist. (4), XI, March, 1873, pp. 213, 214).

Cervus leucotis Gray identified with *Cervus chilensis* Gay & Gervais, and *Anomalocera huamel*, *Xenalaphus huemel* and *Xenelaphus leucotis* Gray with *Cervus antisiensis* D'Orbigny.

1870 [*Felis warwickii* Gray = *Felis geoffroyi* D'Orb. & Gerv.] (P. Z. S., 1870, pp. 796, 797).

1875 [The Huemul and its Allies.] (P. Z. S., 1875, pp. 44–47; fig. of left antler, p. 45).

Synonymy and discussion of (1) *Cervus chilensis*, (2) *Cervus antisiensis*, (3) *Cervus whitelyi*, and (4) *Cervus peruvianus*.

Scott, W. B.

1902 The Origin and Development of South American Mammals (Science, N. S., XV, No. 337, pp. 470, 471; Ann. N. York Acad. Sci., XV, 1903, 14, 15).

Abstract of a paper read before New York Academy of Sciences.

Thomas, Oldfield.

1880 Description of a new Species of *Reithrodon*, with Remarks on other Species of the Genus (P. Z. S., 1880, pp. 691–696, 4 text cuts).

Reithrodon alstoni, sp. nov. (= type of the genus *Sigmomys* Thomas, 1901), with a discussion of the relationships of *R. typicus*, *R. cuniculoides*, and *R. chinchilloides*.

1881 Account of the Zoological Collections made during the Survey of H.M.S. "Alert" in the Straits of Magellan and on the Coast of Patagonia. I, Mammalia. By Oldfield Thomas (P. Z. S., 1881, pp. 3–6).

An annotated list of 10 species; *Hesperomys* (*Calomys*) *coppingeri*, sp. nov., p. 4.

1889 Preliminary Notes on the Characters and Synonymy of the different Species of Otter (P. Z. S., 1889, pp. 190–200).

Important critical comment on the South American species, pp. 196–200.

1891 Notes on some Ungulate Mammals (P. Z. S., 1891, pp. 384–389).

On the generic and specific names of the Llamas and Alpaca, pp. 385–387.

1894 Descriptions of some new Neotropical Muridæ (Ann. & Mag. Nat. Hist. (6), XIV, Nov., 1894, pp. 346–366).

Includes, among numerous other species, *Acodon macronyx*, n. sp. (p. 362), from near Fort San Rafael, Province of Mendoza, east side of Andes.

1895 Descriptions of Four small Mammals from South America, including one belonging to the peculiar Marsupial Genus "*Hyracodon*" Tomes (Ann. & Mag. Nat. Hist. (6), XVI, Nov., 1895, pp. 367–370).

Includes *Acodon hirtus*, sp. nov. (p. 370), from Fort San Rafael, Mendoza.

Thomas, Oldfield.

1897 Descriptions of Four new South American Mammals (Ann. & Mag. Nat. Hist. (6), XX, Aug., 1897, pp. 118–221).

Oxymycterus lanosus, sp. nov., p. 118, from Monteith Bay, Straits of Magellan.

1897 On some small Mammals from Salta, N. Argentina (Ann. & Mag. Nat. Hist. (6), XX, Aug., 1897, pp. 214–218).

1898 On some Mammals obtained by the late Mr. Henry Durnford in Chubut, E. Patagonia (P. Z. S., 1898, pp. 210–212).

An annotated list of 7 species, with field notes by Mr. Durnford, collected on the coast about 60 miles south of the Rio Chubut (*cf.* Ibis, 1878, p. 391).

1901 On a new Form of Puma from Patagonia (Ann. & Mag. Nat. Hist. (7), VIII, Sept., 1901, pp. 188, 189).

Felis concolor pearsoni, subsp. nov.

1901 New Neotropical Mammals, with a Note on the Species of *Reithrodon* (Ann. & Mag. Nat. Hist. (7), VIII, Sept., 1901, pp. 246–255).

Note on the species of South American groove-toothed Muridæ, which are here separated into 3 genera (*Reithrodon, Euneomys, Sigmomys*) and 8 species.

1901 The name of the Viscacha (Proc. Biol. Soc. Washington, XIV, p. 25).

Viscaccia Schinz, 1825, the proper generic name for the Argentine Viscacha, also correcting Mr. J. G. Rehn, on *Viscaccica* Brandis ex Molina. Also *Lagidium viscacia* (Molina) the proper name of the Chilian Viscacha.

1901 On a Collection of Bats from [Central] Paraguay (Ann. & Mag. Nat. Hist. (7), VIII, Nov., 1901, pp. 435–443).

An annotated list of 19 species, the collection including topotypes of 8 of Azara's species.

1902 On Mammals from the Serra do Mar of Paraná, collected by Mr. Alphonse Robert (Ann. & Mag. Nat. Hist. (7), IX, Jan., 1902, pp. 59–64).

Annotated list of 18 spp.; *Akodon serrensis, Coendou roberti*, spp. nov.

1902 On Mammals collected by Mr. Perry O. Simonds on the southern part of the Bolivian Plateau (Ann. & Mag. Nat. Hist. (7), IX, March 1902, pp. 222–230).

Annotated list of 17 spp.; *Phyllotis arenarius, P. hirtipes, Ctenomys frater, Kerodon niator pallidior*, spp. et subsp. nov.

1902 On Mammals collected at Cruz del Eje, Central Cordova, by Mr. P. O. Simons (Ann. & Mag. Nat. Hist. (7), IX, April, 1902, pp. 237–245).

An annotated list of 14 spp.; *Lasiurus borealis salinæ, Conepatus proteus, Eligmodontia griseoflava centralis, Ctenomys bergi, Dolichotis magellanicus centricola, Dasypus vellerosus pannosus*, spp. et subspp. nov. Note on the proper name of Azara's "Chauve-souris septième."

1902 The generic names of the Peccaries, Northern Fur Seal, and Sea-Leopard (Proc. Biol. Soc. Washington, XV, 1902, pp. 153–156).

Callorhinus and *Callirhinus* considered as "permissible variants" of one compound; *Stenorhinchus* held to be not invalidated by the earlier *Stenorhynchus* or *Stenorynchus* for the Leopard Seal.

1903 Notes on Neotropical Mammals of the Genera *Felis, Hapale, Oryzomys, Akodon*, and *Ctenomys*, with Descriptions of new Species (Ann. & Mag. Nat. Hist. (7), XII, Aug., 1903, pp. 234–243).

Thomas, Oldfield.

Chelemys (new subgen. of *Akodon*), p. 242. Type, *A. macronyx* Thomas. Also *Akodon suffusus*, sp. nov., p. 241, Southern Chubut, Patagonia; *Akodon* (*Chelemys*) *vestitus*, sp. nov. (p. 242), Southern Chubut, Patagonia.

Townsend, Charles H.

1899 Pelagic Sealing, with notes on the Fur Seals of Guadalupe, the Galapagos, and Lobos Islands (The Fur Seals and Fur Seal Islands of the North Pacific Ocean, Part III, pp. 223–274, pll. xxii–xxxv).

Important notes on the Guadalupe Island Fur Seal, pp. 265–272; and on the Galapagos Islands Fur Seal, pp. 272, 273; note on the Lobos Islands Fur Seal rookery, with a photograph (pl. xxxv) of a portion of the islands covered by seals.

Turner, William, and **Wm. C. Strettell Miller.**

1888 Report on the Seals collected during the Voyage of H.M.S. Challenger in the years 1873–76 (Zool. Challenger Exped., Part LXVIII, 1888, pp. 1–240, pll. 10).

Part I, Description of Genera and Species, pp. 3–54; Part II, Classification of the Pinnipedia, pp. 55–88; Part III, Brain of Elephant Seal and of Walrus, pp. 89–134; Part IV, Viscera of Elephant Seal, pp. 135–138. Appendix. The Myology of the Pinnipedia, by W. C. Strettell Miller, pp. 139–234.

The species here recognized are (1) *Macrorhinus leoninus*, (2) *Leptonychotes weddellii*, (3) *Otaria jubata*, (4) *Arctocephalus gazella*, (5) *Arctocephalus australis*.

Waterhouse, George R.

1837 Characters of New Species of the Genus *Mus*, from the Collection of Mr. Darwin (P. Z. S., 1837, 15–21, 27–32).

Twenty-two new species, four new subgenera, and two new genera.

1848 A | Natural History | of the | Mammalia. | By | George R. Waterhouse, | . . . . [= 3 lines of titles] Vol. II. | Containing the Order | Rodentia, or Gnawing Mammalia; | with | 22 illustrations engraved on steel, and engravings on wood. | London: Hippolyte Baillière, Publisher, 219 Regent Street; | . . . . [= 4 lines] 1848.—8vo, pp. 1–500, pll. i–xxi + x*.

Includes the Patagonian Rodents, except the Muridæ.

Waterhouse, George R., and **Charles Darwin.**

1839 The | Zoology | of | the Voyage of H.M.S. Beagle, | under the command of Captain Fitzroy, R.N., | during the Years | 1832 to 1836. | Published with the approval of | the Lords Commissioners of Her Majesty's Treasury. | Edited and Superintended by | Charles Darwin, Esq., M.A., F.R.S., Sec. G. S. | Naturalist to the Expedition. | — | Part II. | Mammalia, | by | George R. Waterhouse, Esq. | Curator of the Zoological Society of London, etc., etc. | — | London: | Published by Smith, Elder and Co. 65 Cornhill. | MDCCCXXXIX. | — | 4to, pp. ix + v, + 97, pll. xxxv (32 col.). The first of the two half titles reads:

Mammalia, | Described by | George R. Waterhouse, Esq. | Curator of the Zoological Society of London, etc. etc. | with | a Notice of their Habits and Ranges, | by Charles Darwin, Esq., M.A., F.R.S. | Secretary to the Geological Society. | Illustrated by numerous coloured engravings.

Waterhouse, George R., and **Charles Darwin.**

The most important original source of information on Patagonian Mammals. In several cases Darwin's Patagonian specimens became the types of species described by Waterhouse in 1837, and here redescribed and to a large extent figured. Darwin's notes on their habits and ranges are invaluable.

Weddell, James.

1825 A | Voyage | towards | the South Pole, | performed in the years 1822–23. | Containing | an examination of the Antarctic Sea, | to the seventy-fourth degree of latitude: | and | A visit to Tierra del Fuego, | with a particular account of the inhabitants. | To which is added, | much useful information on the coasting navigation of | Cape Horn, and the adjacent lands, | with charts of harbours, &c. | — | By James Weddell, Esq. | Master in the Royal Navy. | — | London: | printed for | Longman, Hurst, Rees, Orme, Brown, and Green, | Paternoster-row. | 1825. — 8vo, pp. i–iv + 1–276, with maps, charts and other illustrations.

Contains much valuable information on the habits of the seals of southern South America and the islands to the southward, and their destruction for commercial purposes. Also first description (by Prof. Jameson) and figure of Weddell's Seal, which formed the basis of Lesson's *Otaria weddellii* (= *Leptonychotes weddellii*).

Wilson, Edward A.

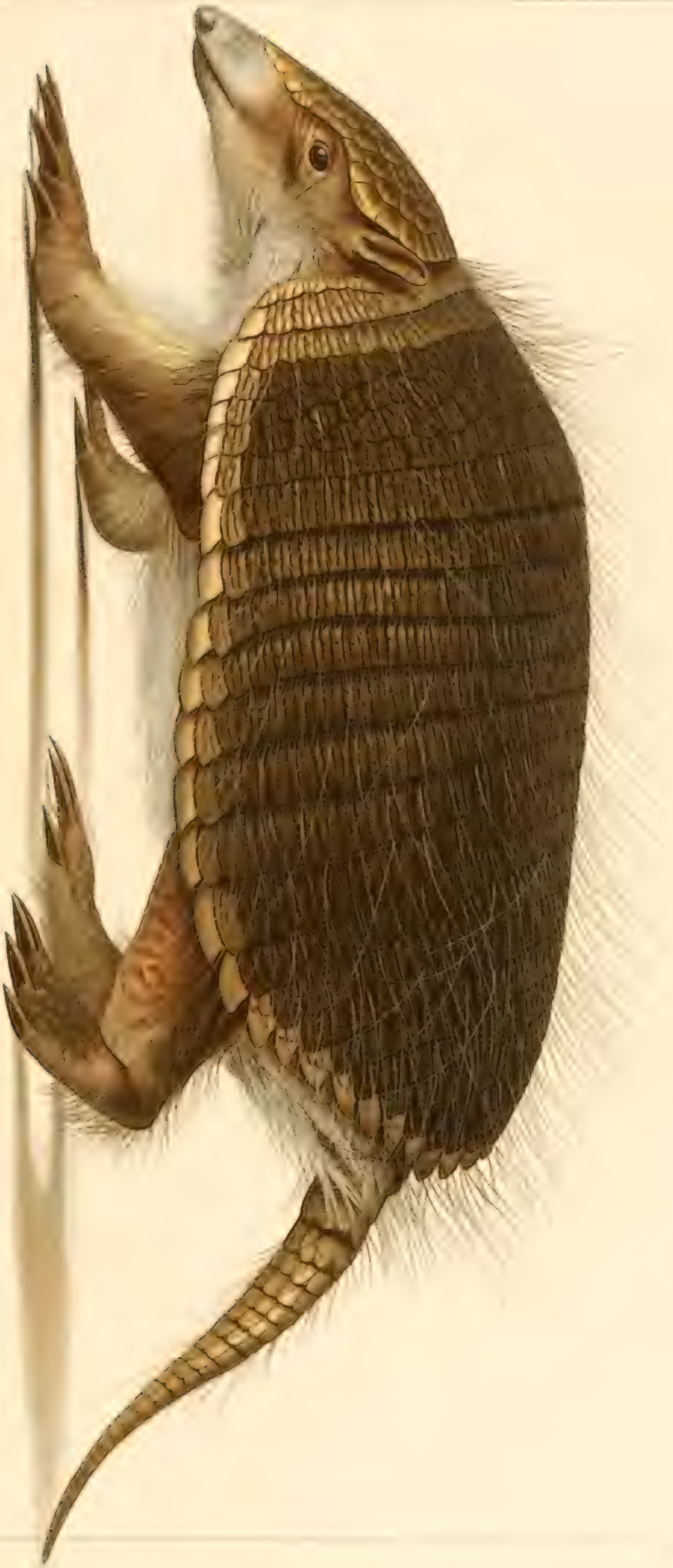
1902 Notes on Antarctic Seals, collected during the Expedition of the 'Southern Cross' (Report Nat. Hist. Collections of the 'Southern Cross,' 1902, pp. 67–78, pll. ii–vi).

On the distribution and habits of *Leptonychotes weddellii* (pp. 69–71, pl. ii), *Ogmorhinus leptonyx* (pp. 71–73, pl. iii), *Lobodon carcinophagus* (pp. 74–76, pll. iv and v), *Ommatophoca rossii* (pp. 76–78, pl. vi), with colored plates of the animals.

EXPLANATION OF PLATE I.

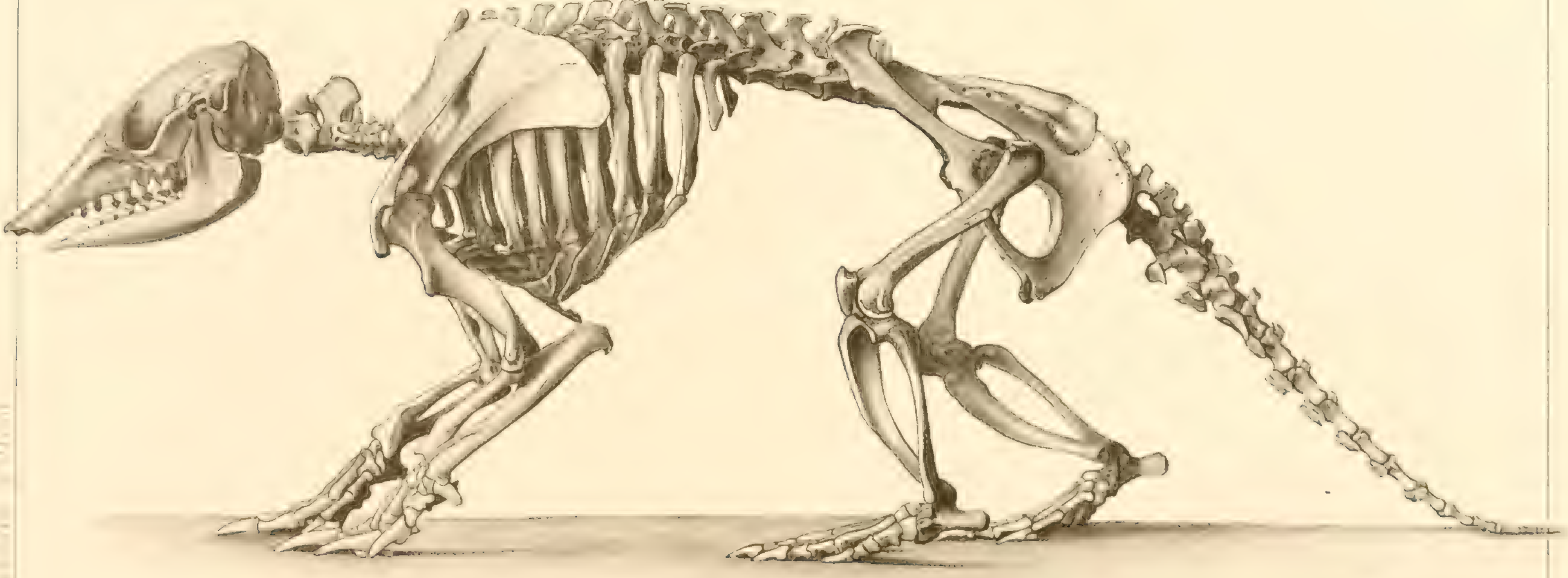
PAGE

ZAËDYUS CILIATUS: Animal, ♂ ad., about ⅞ natural size. Swan Lake, Patagonia. No. 30, Colburn Collection 7



EXPLANATION OF PLATE II.

ZAËDYUS CILIATUS: Skeleton, nearly natural size. Swan Lake, Patagonia. Princeton Museum. 7



ZAEDYUS [illegible]

EXPLANATION OF PLATE III.

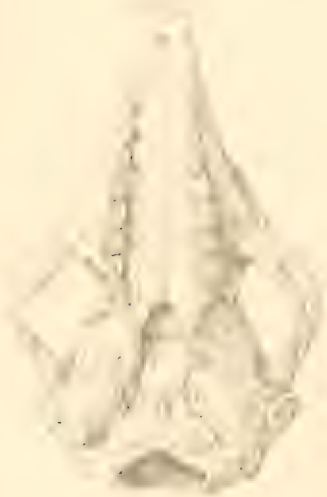
PAGE

Zaëdyus ciliatus: Three skulls, showing variation with age. Figures all natural size.

Fig. 1–1*b*. Skull, ♂ ad., Swan Lake, Patagonia. No. 31, Colburn Collection.

Fig. 2–2*b*. Young male, Swan Lake, Patagonia. No. 32, Colburn Collection.

Fig. 3–3*b*. A very old skull, junction of Rio Chico with Rio Santa Cruz. Am. Mus. No. 17,447 8



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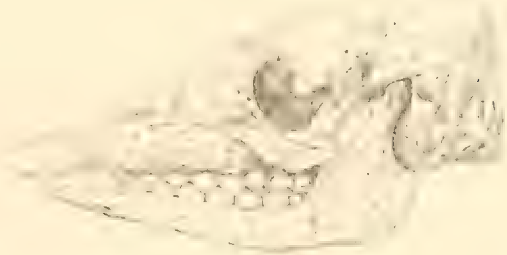

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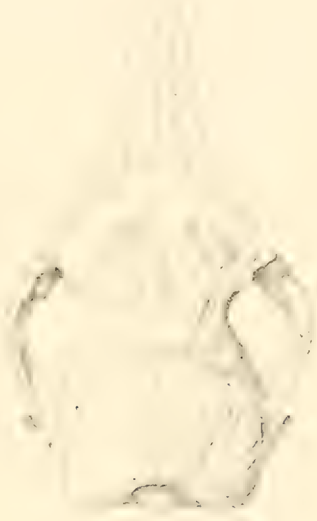

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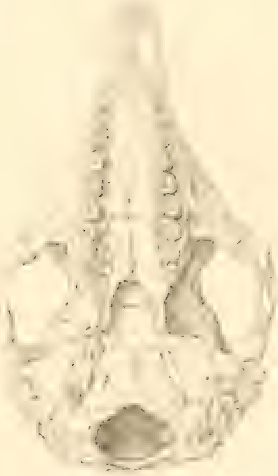

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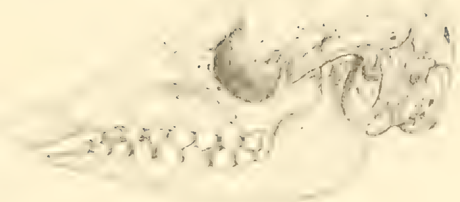

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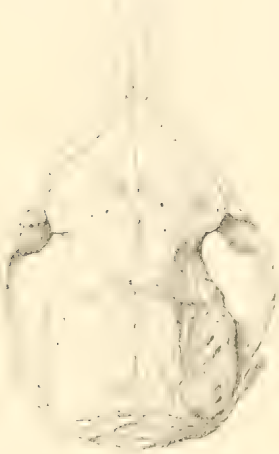

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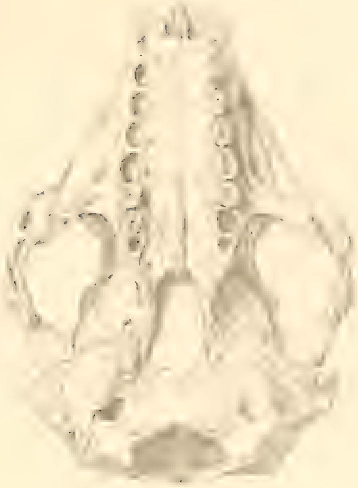

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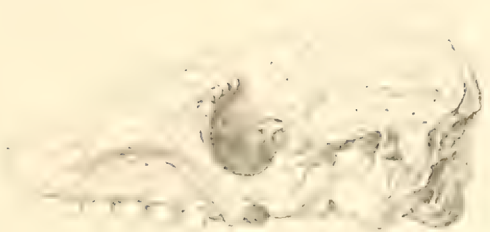

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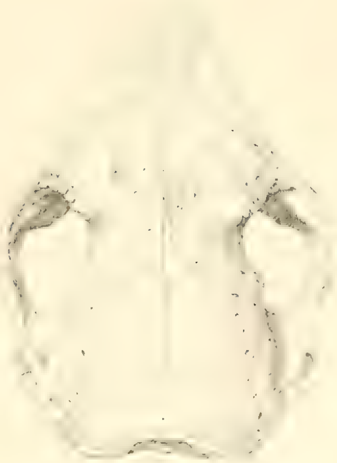
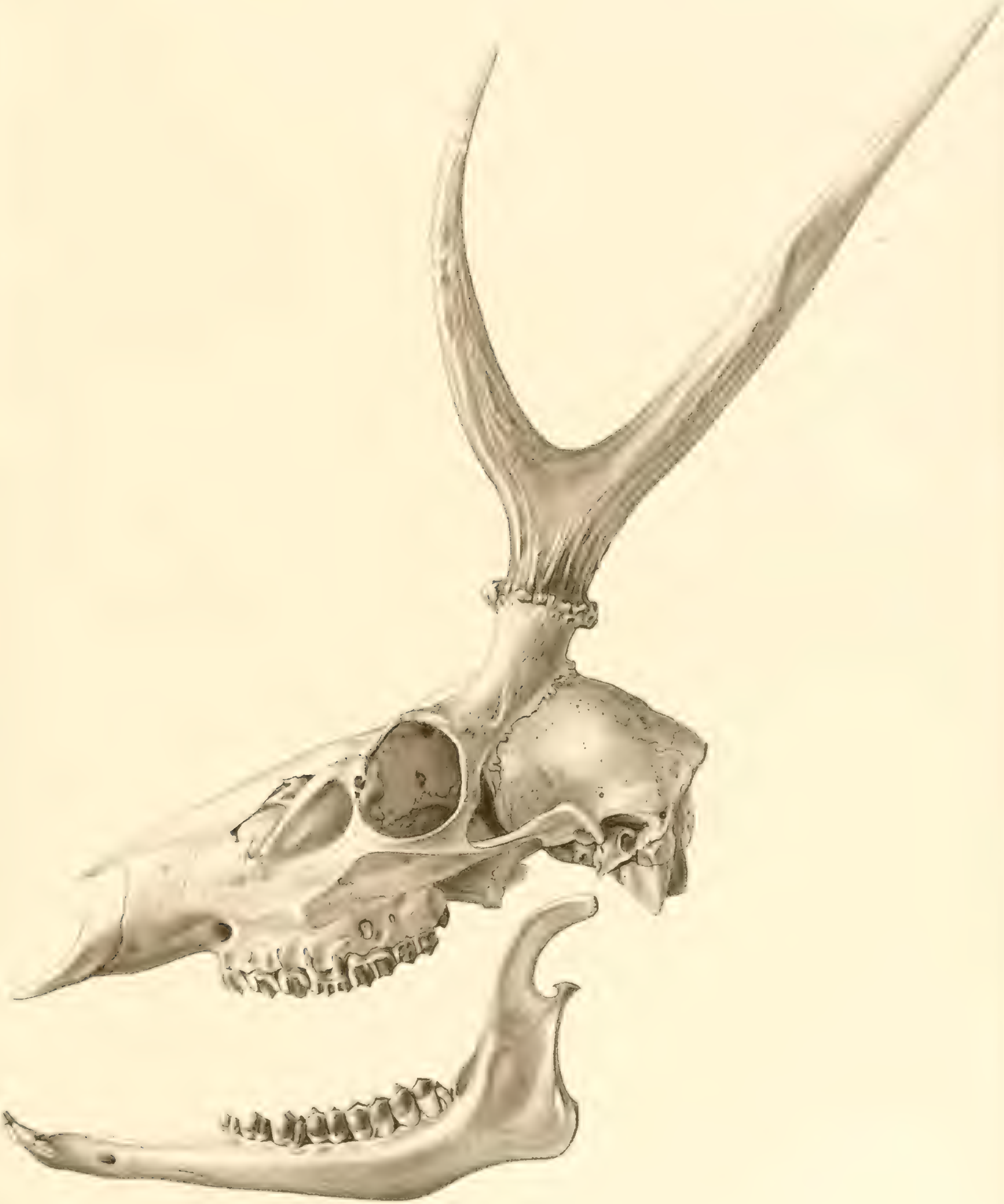


Werner & Winter, Frankfurt a/M. lith.

ZAEDYUS.

EXPLANATION OF PLATE IV.

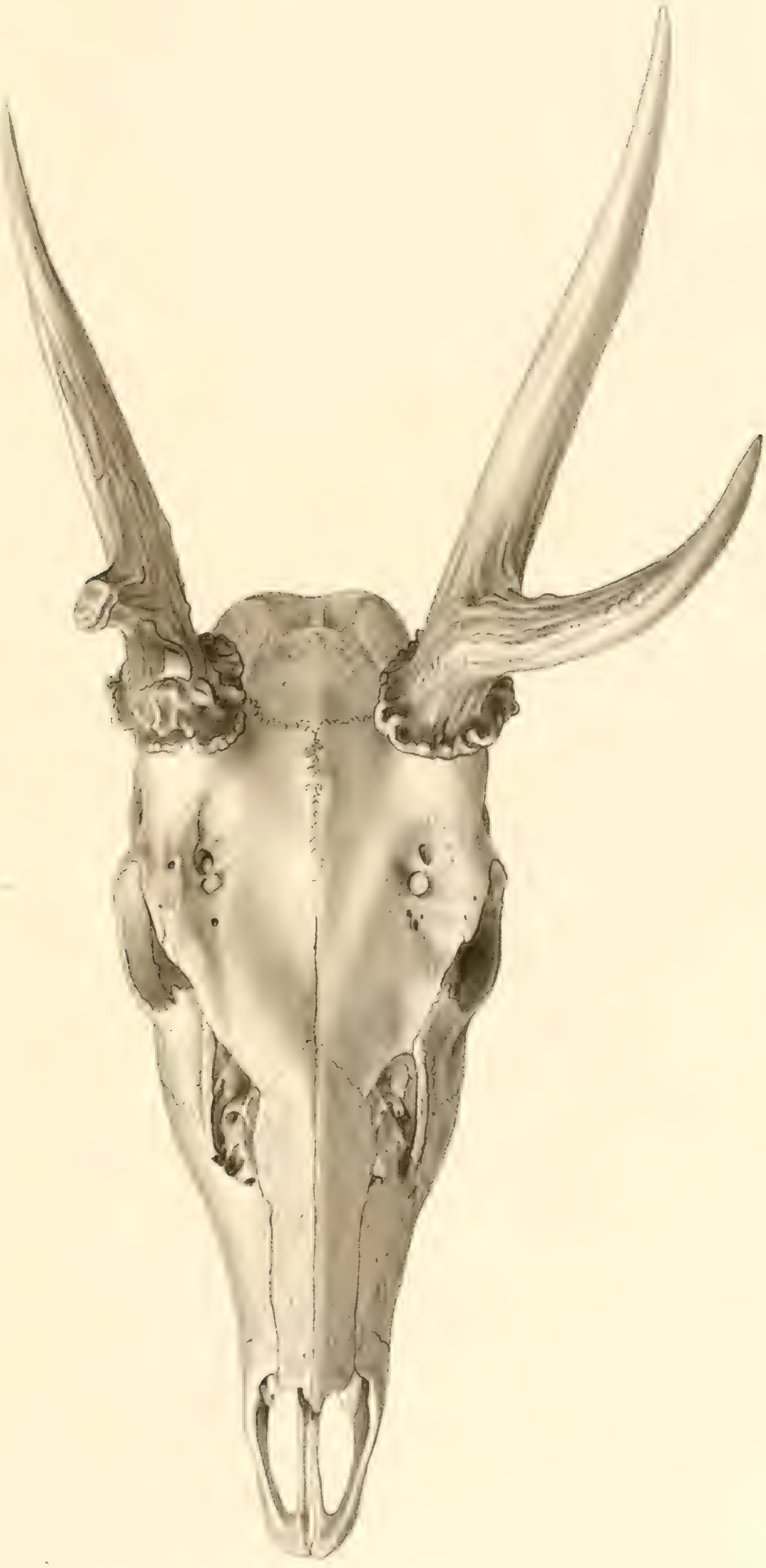
	PAGE
HIPPOCAMELUS BISULCUS: Skull. ♂ ad., × ½. Upper Rio Chico, eastern base of Cordilleras, Patagonia. U. S. Nat. Mus. No. 93,399 . .	11



HIPPOCAMELUS BISULCUS

EXPLANATION OF PLATE V.

	PAGE
HIPPOCAMELUS BISULCUS. Upper view of skull shown in Plate IV. . .	11

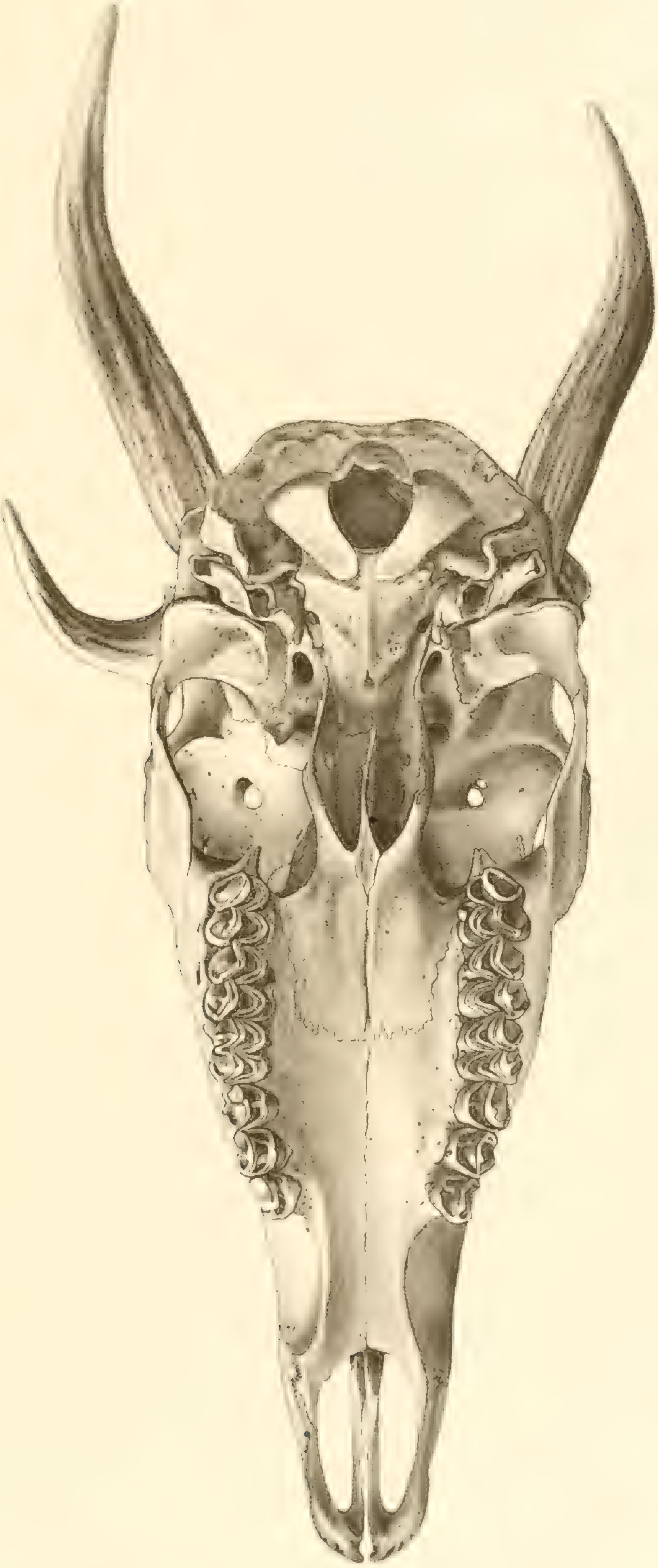


Werner & Winter, Frankfort a/M., lith.

HIPPOCAMELUS BISULCUS.

EXPLANATION OF PLATE VI.

	PAGE
Hippocamelus bisculcus. Lower view of skull shown in Plate IV . .	11



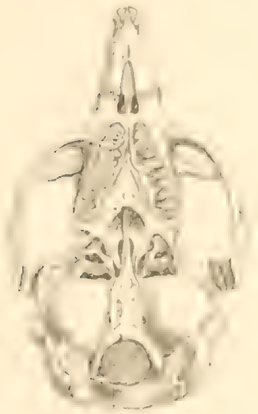
Werner & Winter, Frankfort a/M. lith.

HIPPOCAMELUS BISULCUS.

EXPLANATION OF PLATE VII.

KERODON AUSTRALIS and CTENOMYS OSGOODI.

		PAGE
Fig. 1–1*b*.	KERODON AUSTRALIS: Skull, ♂ ad., $\times \frac{1}{1}$. Upper Rio Chico, near Cordilleras, Patagonia. U. S. Nat. Mus. No. 84,180 . .	25
Fig. 2–2*b*.	CTENOMYS OSGOODI: Type skull, ad., $\times \frac{1}{1}$. Upper Rio Chico, Patagonia. U. S. Nat. Mus. No. 84,149. (*Ctenomys robustus* in text; for change of name see Postscript, p. 191.) . .	38
Fig. 3–3*b*.	CTENOMYS OSGOODI: Skull of ad., $\times \frac{1}{1}$. Upper Rio Chico, Patagonia. U. S. Nat. Mus. No. 84,143.	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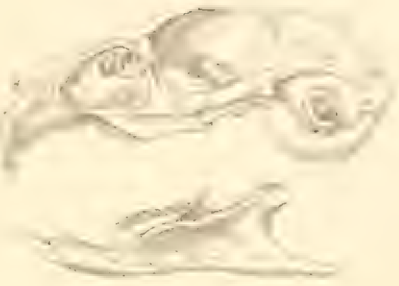
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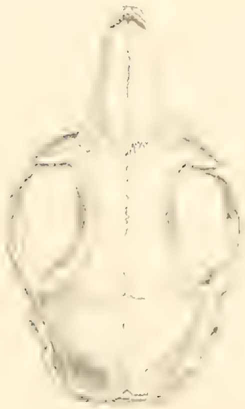
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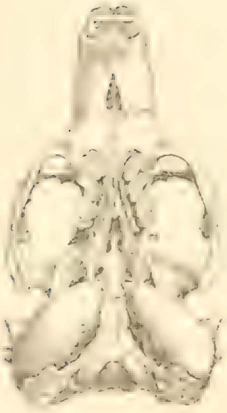
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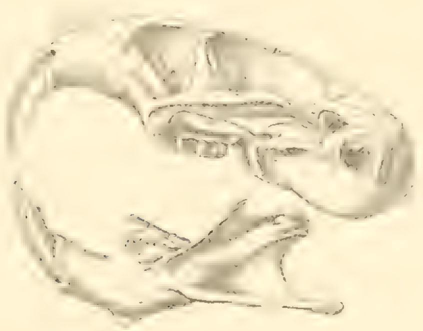
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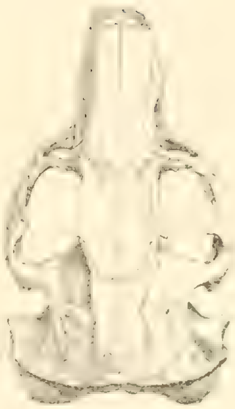
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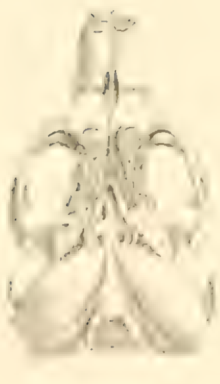
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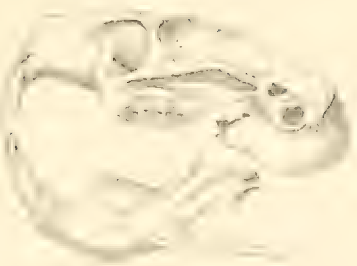
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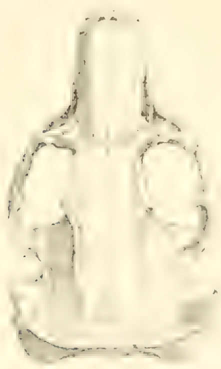
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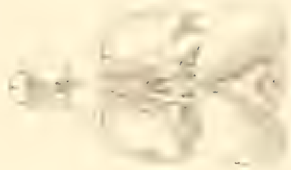
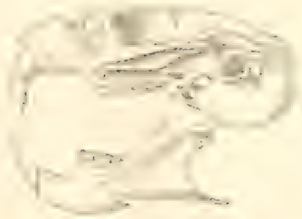
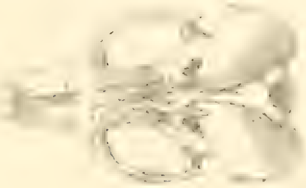
EXPLANATION OF PLATE VIII.

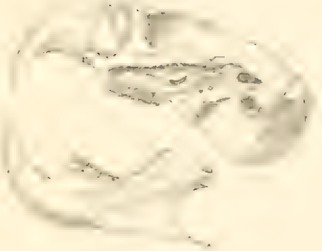
Ctenomys sericeus and Ctenomys colburni.

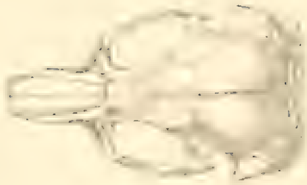
		PAGE
Fig. 1–1.	Ctenomys sericeus: Skull, ♀ ad., × $\frac{1}{1}$. Mayer Basin, upper Rio Chico, Patagonia. U. S. Nat. Mus. No. 84,195 . .	40
Fig. 2–2*b*.	Ctenomys sericeus: Skull, ♂ ad., × $\frac{1}{1}$. Mayer Basin, upper Rio Chico, Patagonia. U. S. Nat. Mus. No. 84,189.	
Fig. 3–3*b*.	Ctenomys colburni: Skull, ♀ ad., × $\frac{1}{1}$. Basalt Cañons, Patagonia. No. 78, Colburn Collection	43
Fig. 4–4*b*.	Ctenomys colburni: Type skull, ♂ ad., × $\frac{1}{1}$. Basalt Cañons, Patagonia. No. 147, Colburn Collection.	

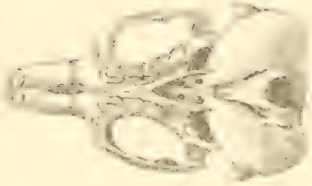


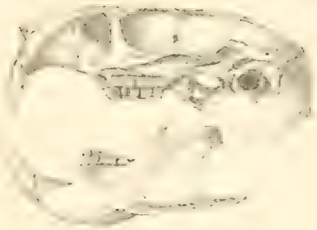


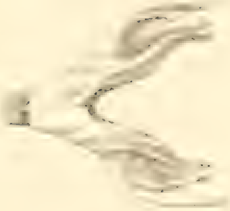


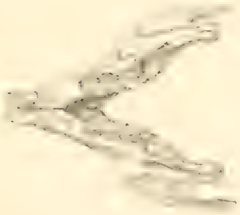


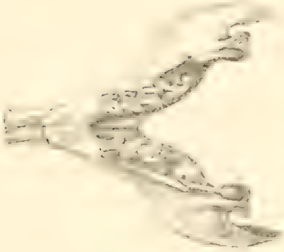


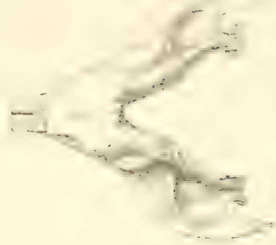


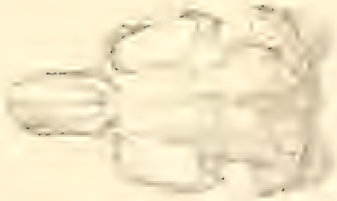


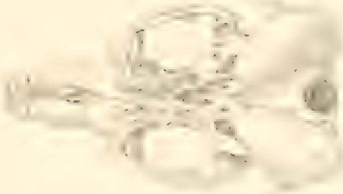


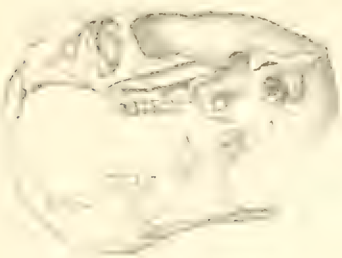












EXPLANATION OF PLATE IX.

Eligmodontia, Oryzomys, and Oxymycterus.

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Fig. 1–1*b*.	Eligmodontia morgani: Skull, ♂ ad., $\times \frac{2}{1}$. Cape Fairweather, Patagonia. U. S. Nat. Mus. No. 92,218	53
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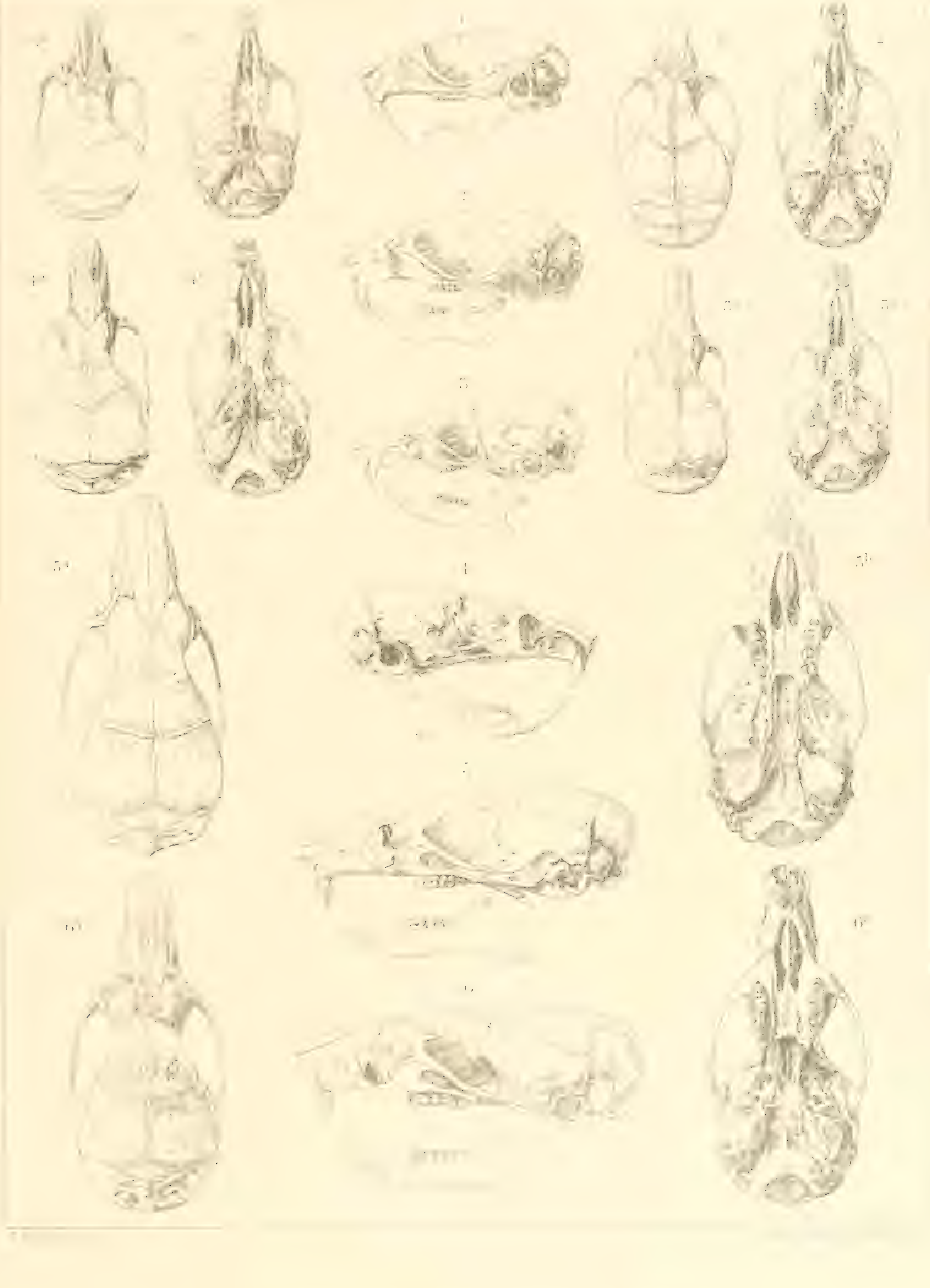

EXPLANATION OF PLATE X.

Oxymycterus, Eligmodontia, and Oryzomys.

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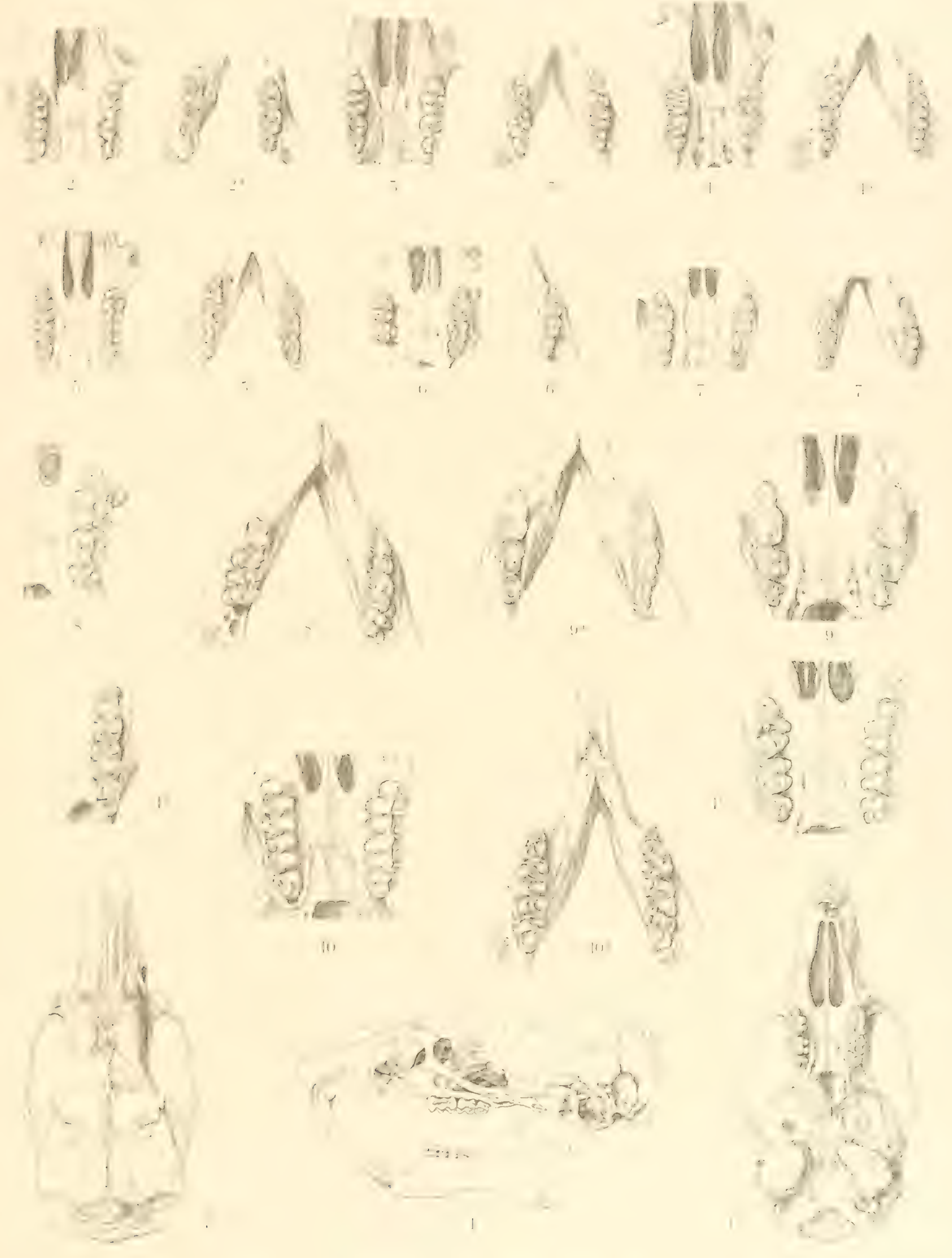
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AKODON. — Six species.

		PAGE
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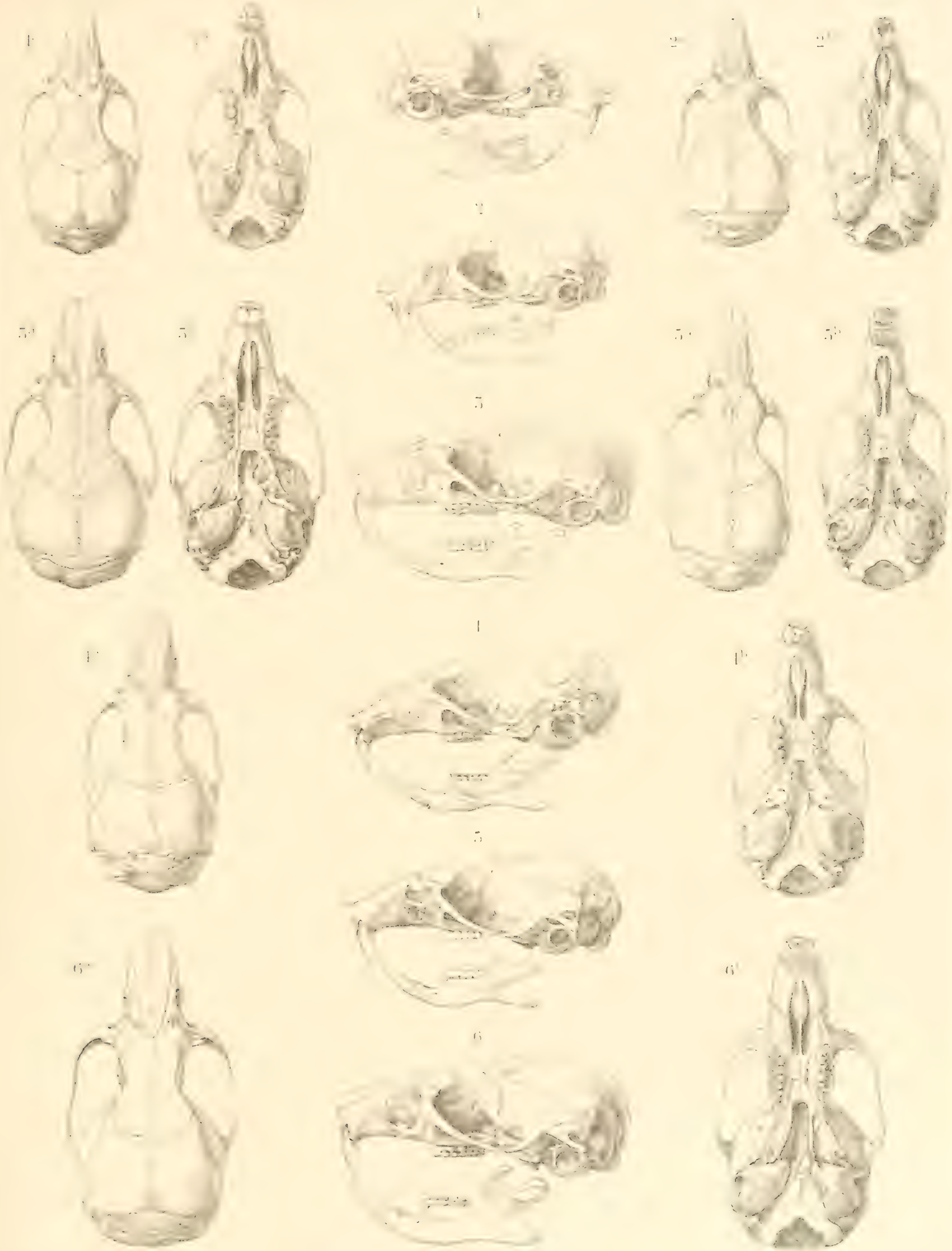
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EXPLANATION OF PLATE XII.

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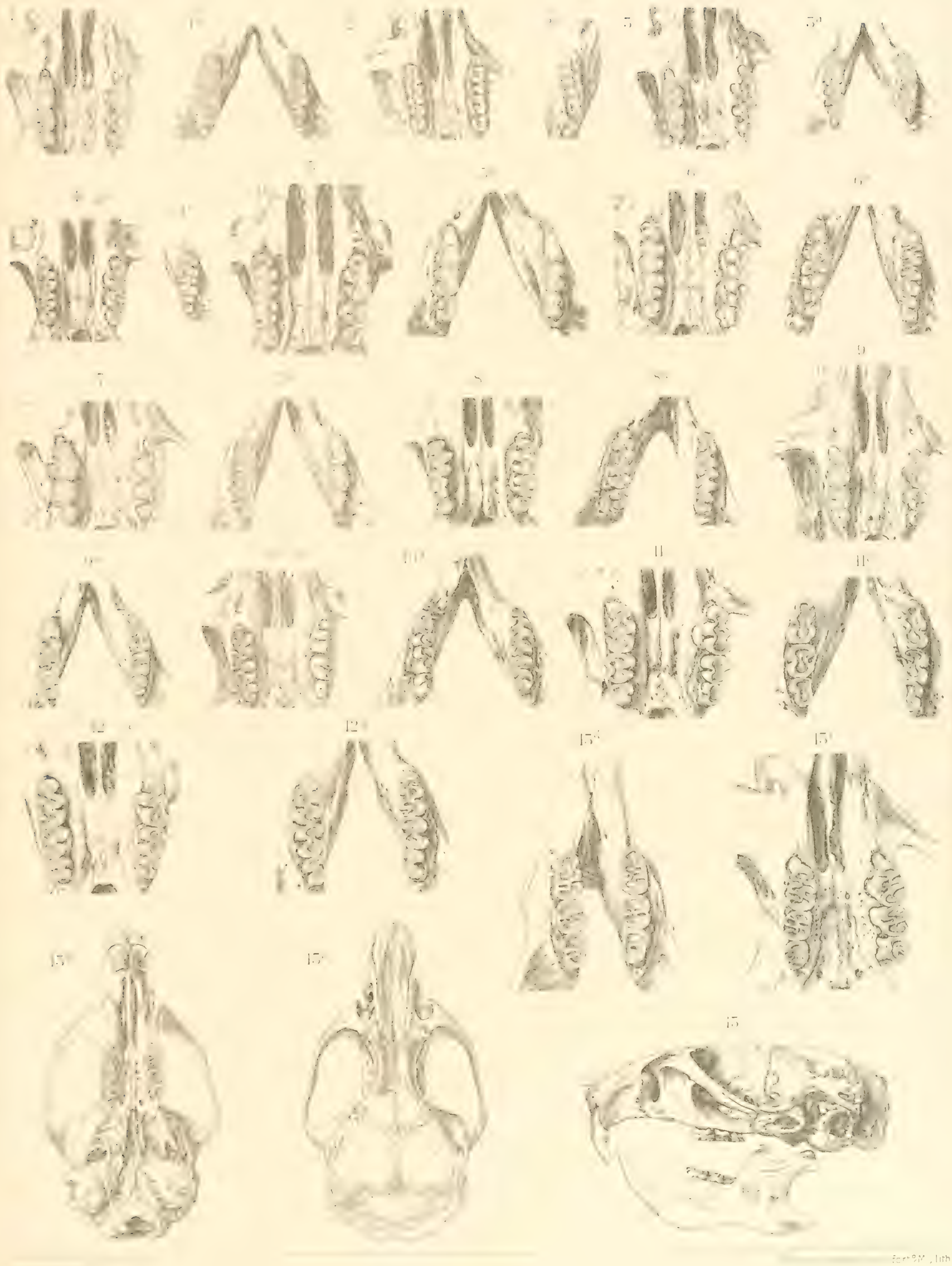
PLATE XII.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EXPLANATION OF PLATE XIII.

PHYLLOTIS and EUNEOMYS.

		PAGE
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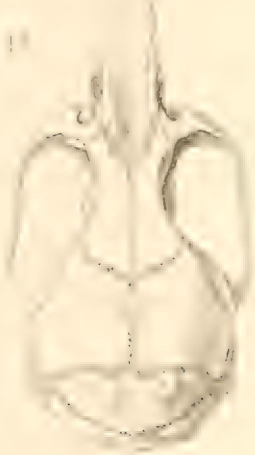

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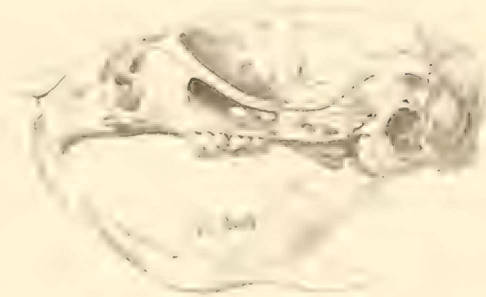

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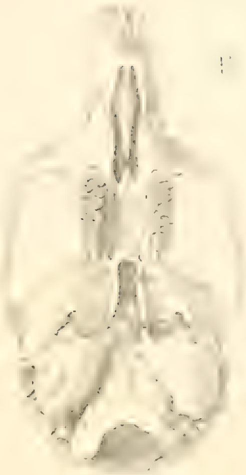

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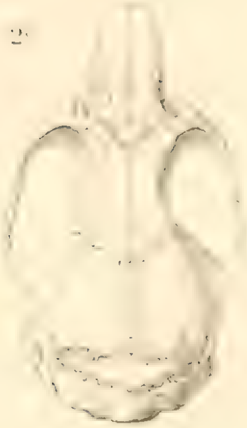

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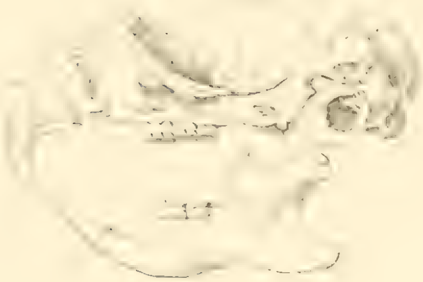

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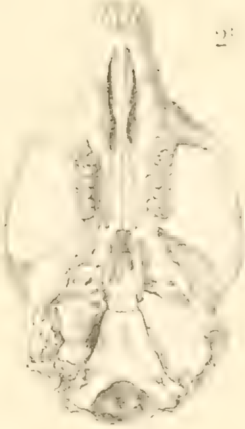

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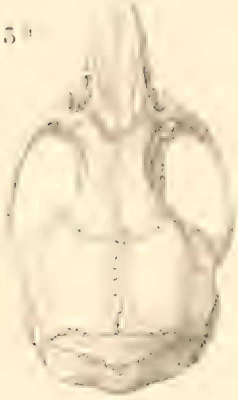

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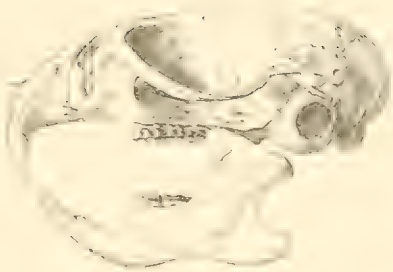

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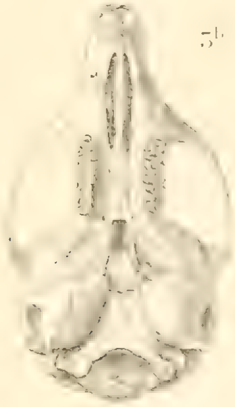

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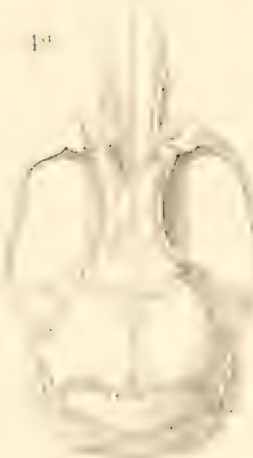

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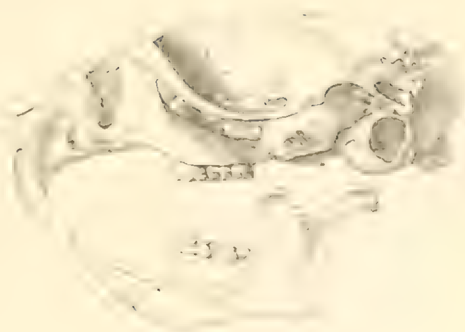

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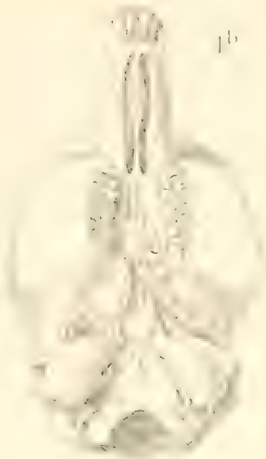

EXPLANATION OF PLATE XIV.

PHYLLOTIS, EUNEOMYS and REITHRODON.

		PAGE
Fig. 1–1*a*.	PHYLLOTIS MICROPUS: Upper and lower teeth, unworn (♂ juv., ×$\frac{4}{1}$), for comparison with worn teeth figured on Plate XII, Fig. 13*c*–13*d*. Upper Rio Chico, Cordilleras, Patagonia. U. S. Nat. Mus. No. 84,292	60
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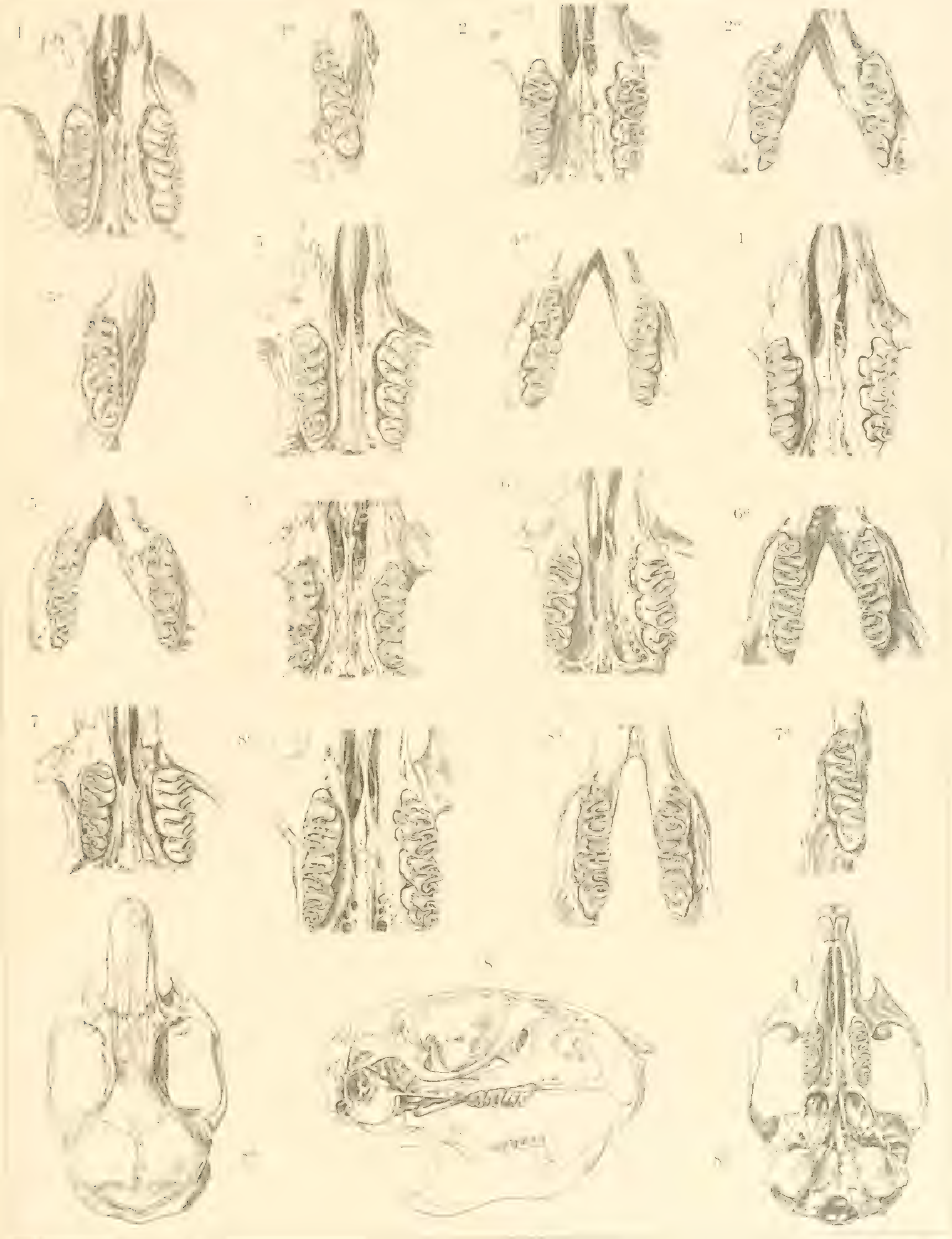
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PHYLLOTIS EUNEOMYS & REITHRODON

EXPLANATION OF PLATE XV.

Arctocephalus australis and A. philippii.

PAGE

Fig. 1. Arctocephalus australis: Side view of skull. ♂ ad., $\times \frac{3}{4}$. Straits of Magellan. U. S. Nat. Mus. No. 23,331 124

Fig. 2. Arctocephalus philippii: Side view of skull, ♂ ad., $\times \frac{3}{4}$. Hood Island, Galapagos Archipelago. U. S. Nat. Mus. No. 23,281 . 131

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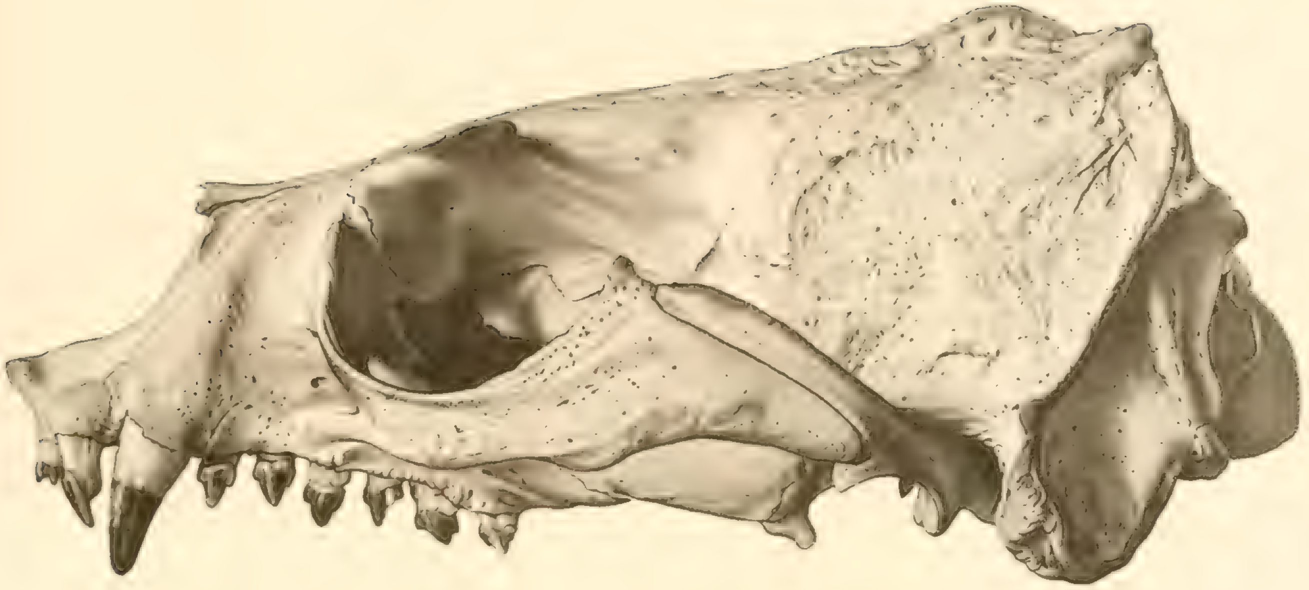

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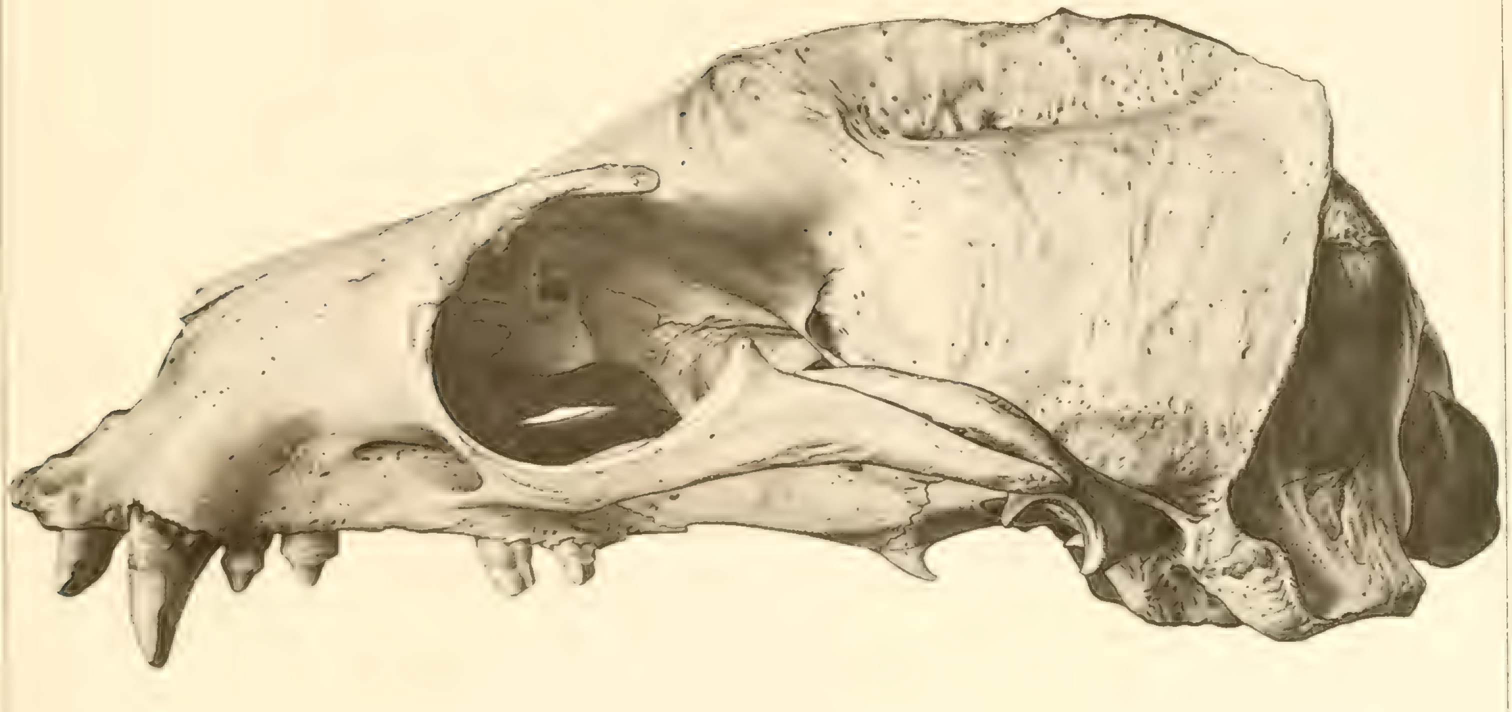

ARCTOCEPHALUS

EXPLANATION OF PLATE XVI.

ARCTOCEPHALUS PHILIPPII and A. AUSTRALIS.

		PAGE
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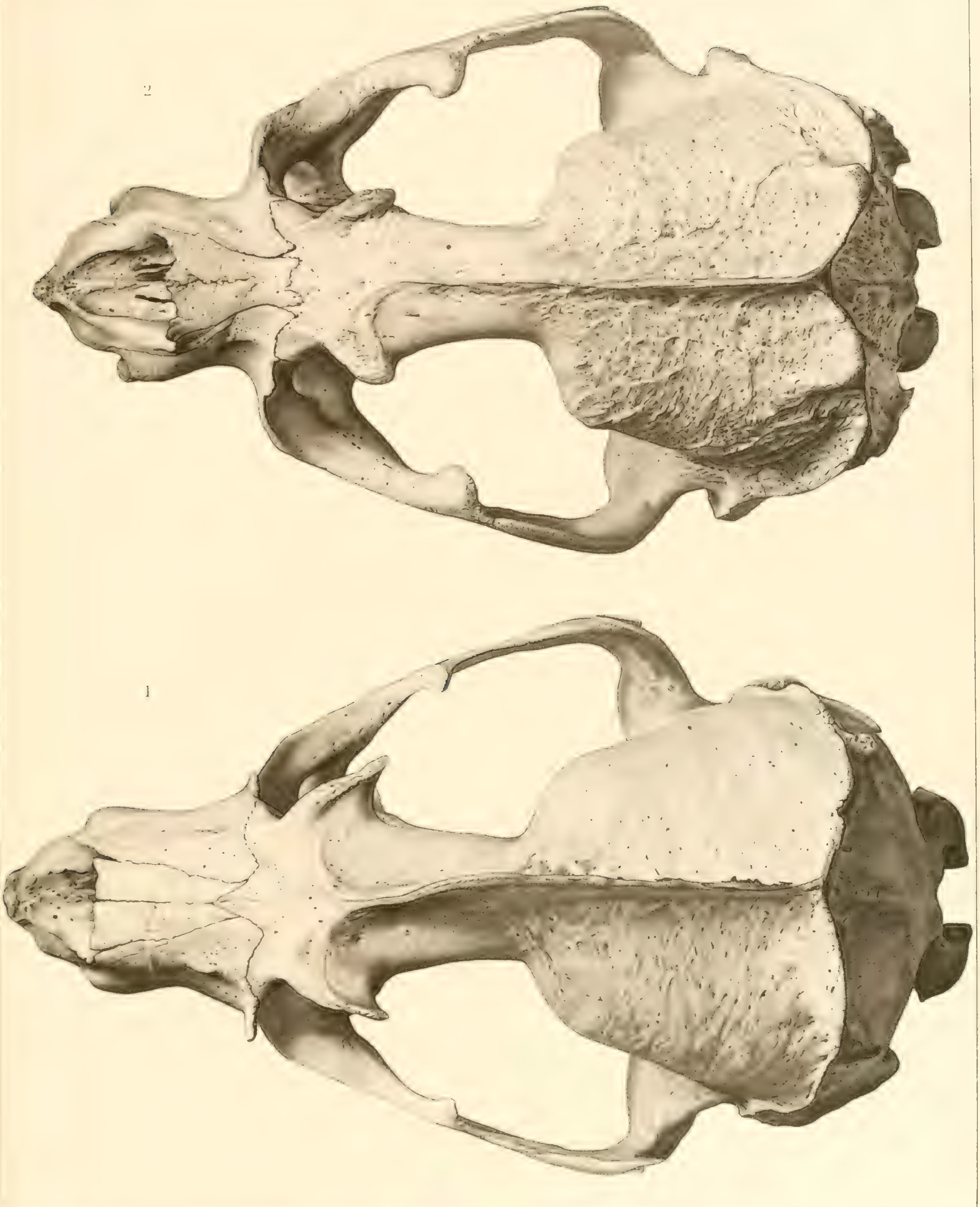
Fig. 2.	ARCTOCEPHALUS AUSTRALIS: Skull, from above, ♂ ad., $\times \frac{3}{4}$. Same skull as Plate XV, Fig. 1	124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EXPLANATION OF PLATE XVII.

Arctocephalus philippi and A. australis.

PAGE

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Fig. 2. Arctocephalus australis: Skull, from below, ♂ ad., $\times \frac{3}{4}$. Same skull as Plate XV, Fig. 1 124

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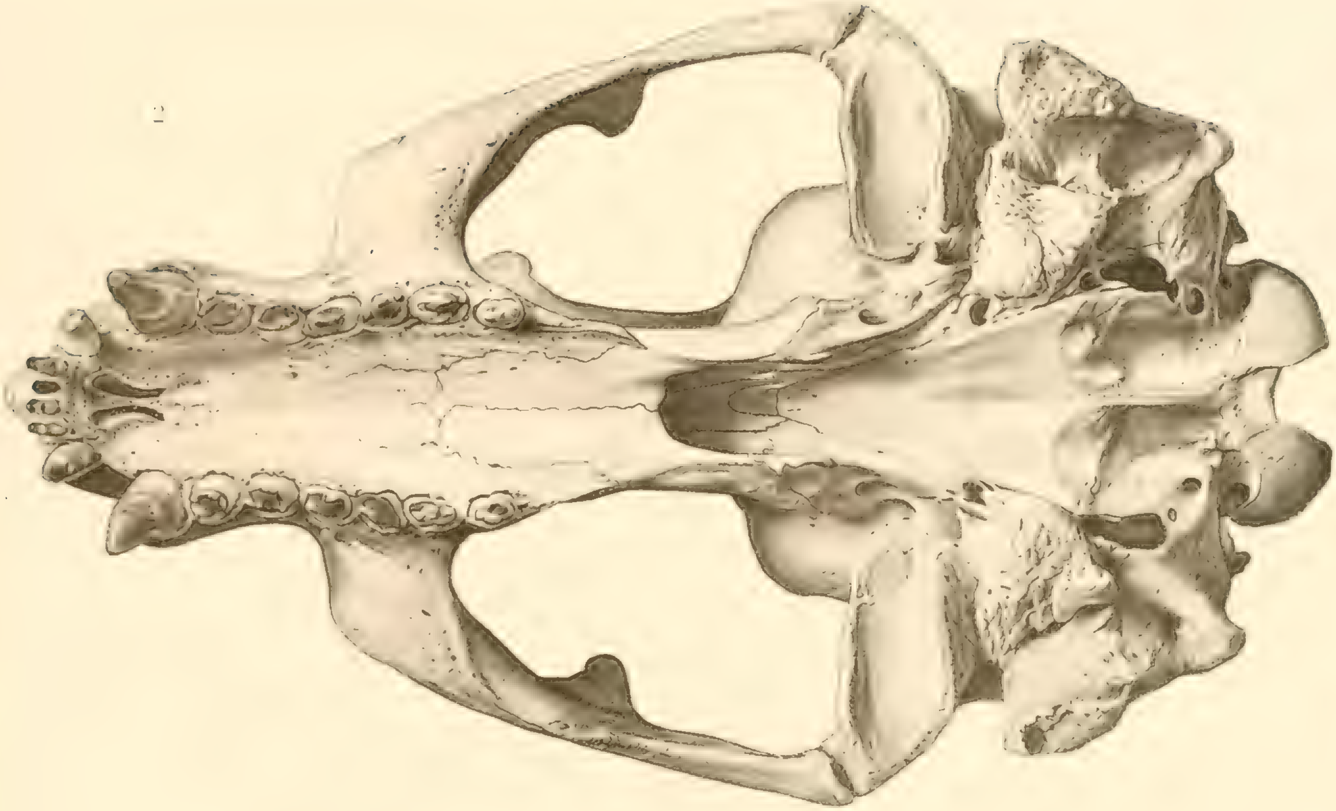

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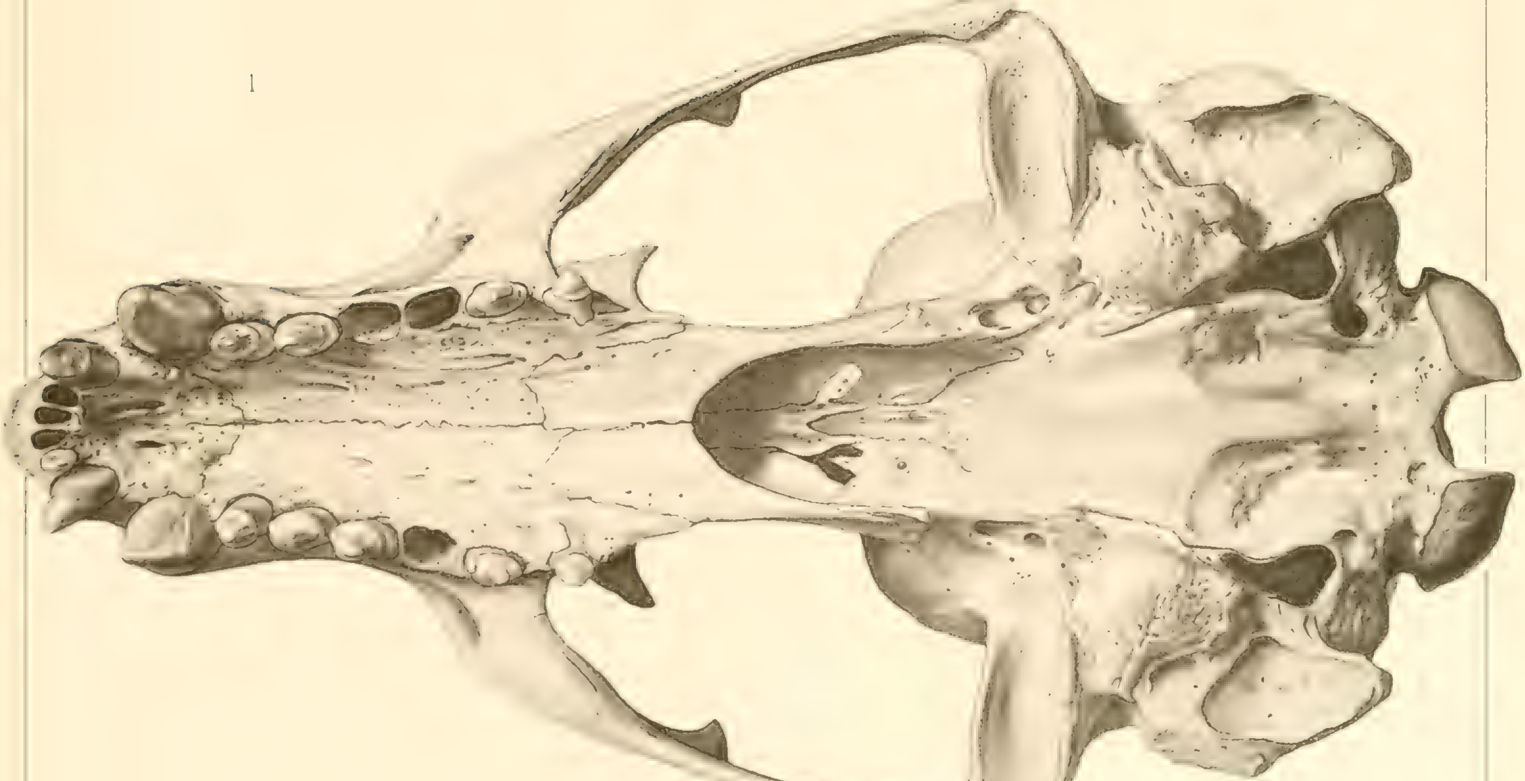

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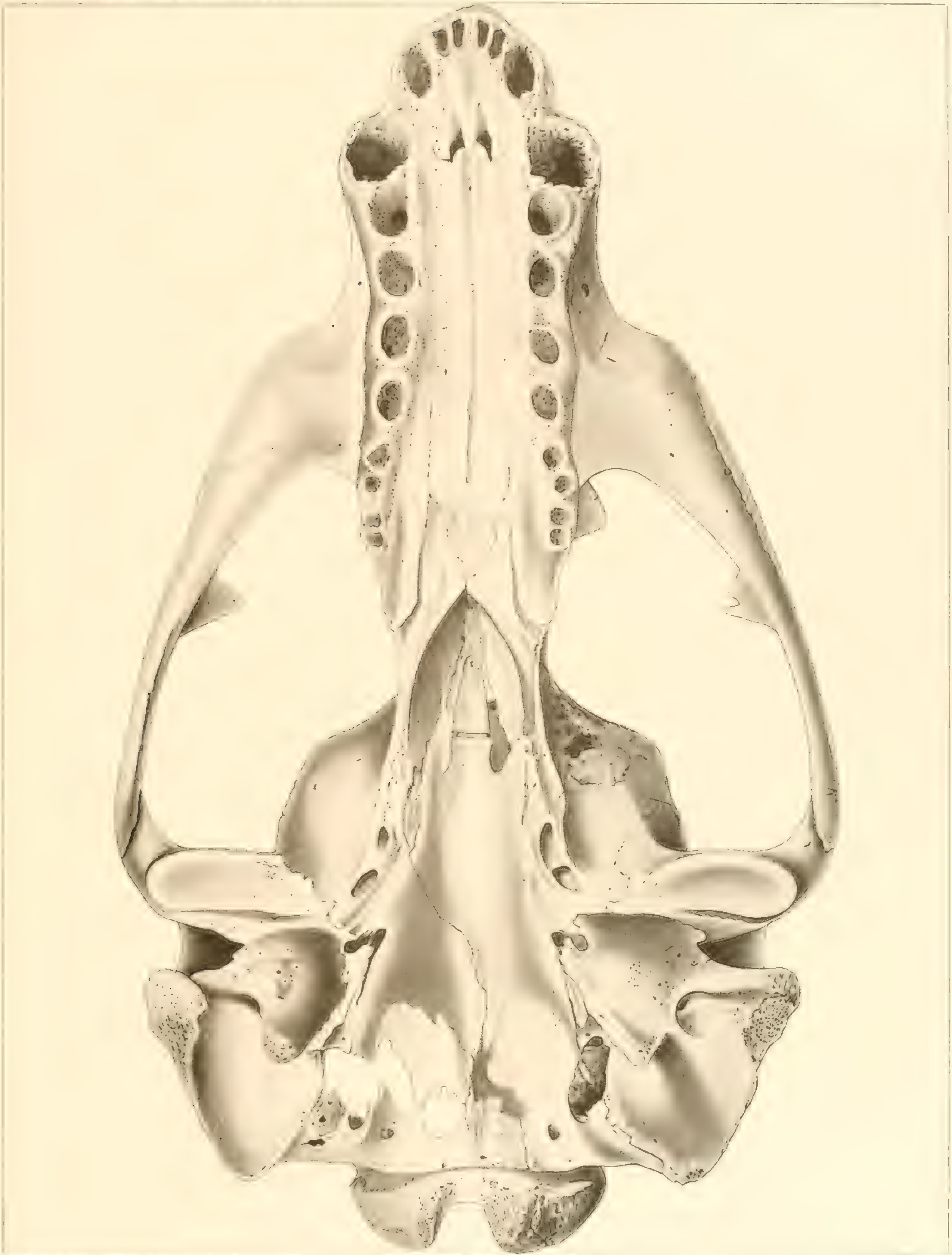
ARCTOCEPHALUS

EXPLANATION OF PLATE XVIII.

ARCTOCEPHALUS TOWNSENDI.

PAGE

Type skull, from below, ♂ ad., $\times\frac{1}{1}$. Guadalupe Island, Lower California.
U. S. N. Mus. No. 83,617 135



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ARCTOCEPHALUS TOWNSENDI

EXPLANATION OF PLATE XIX.

ARCTOCEPHALUS TOWNSENDI.

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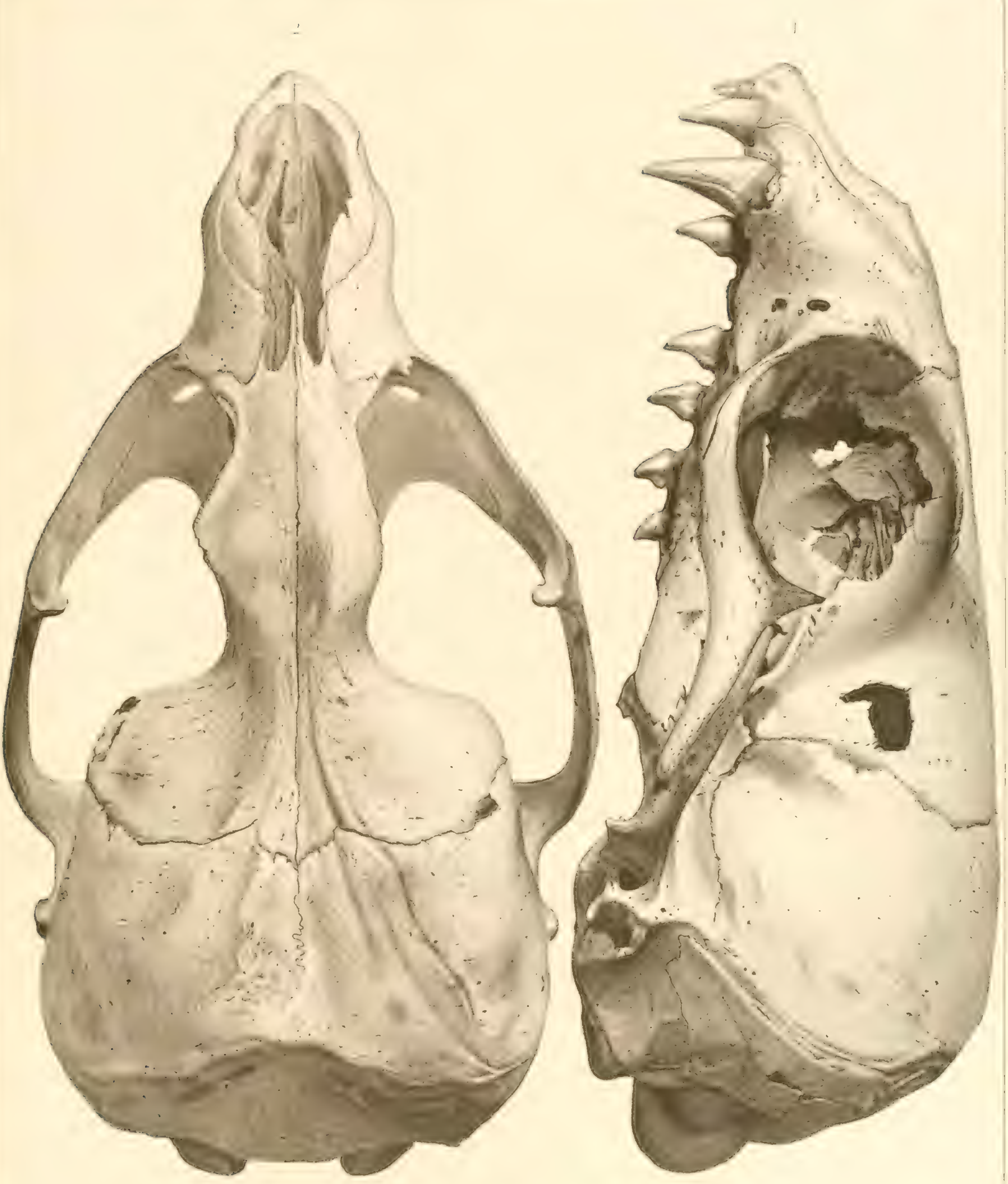
Skull, two views, ♀ ad., × $\frac{1}{1}$. Guadalupe Island, Lower California. U. S. Nat. Mus. No. 83,618	135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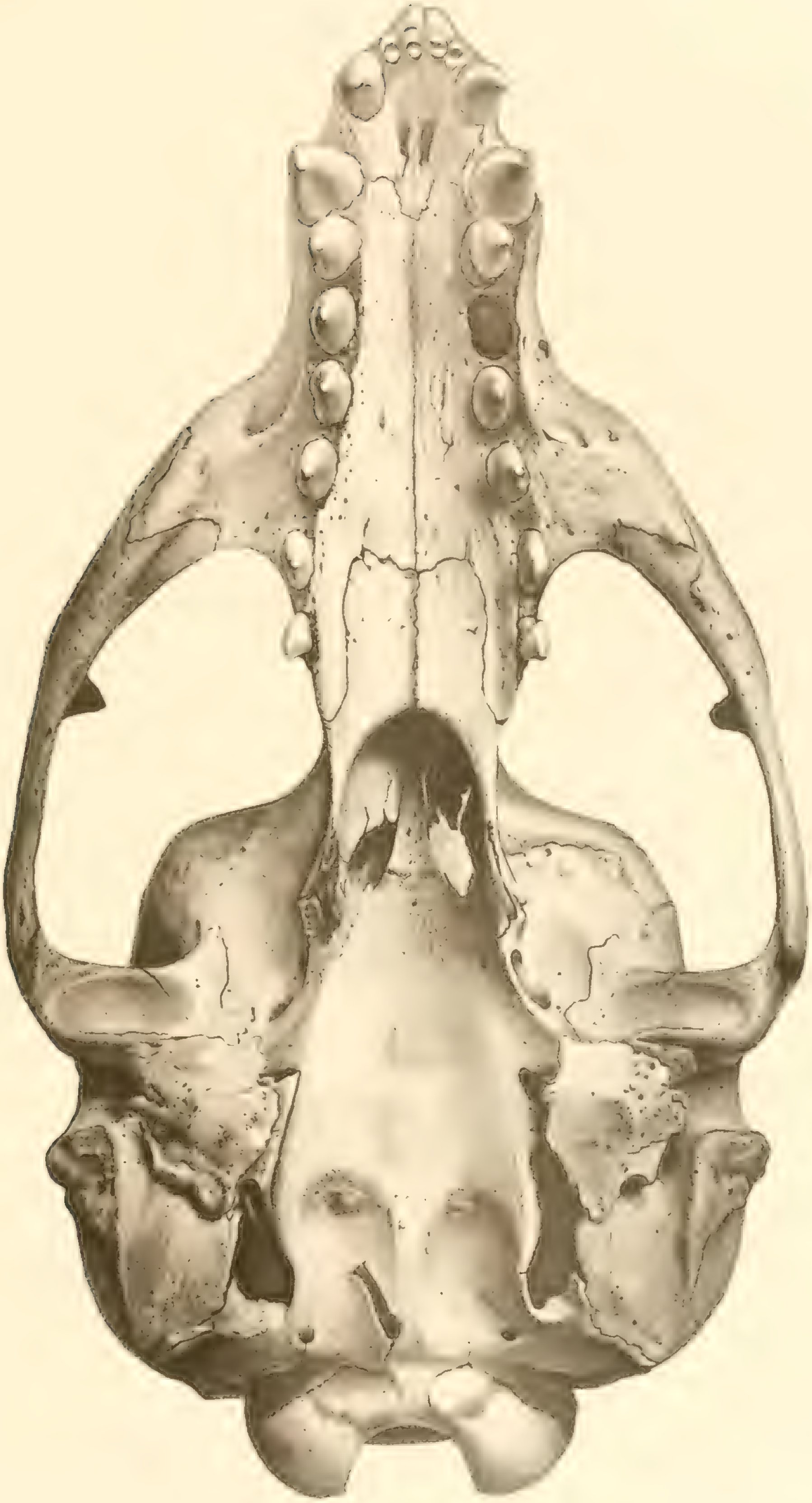
EXPLANATION OF PLATE XX.

ARCTOCEPHALUS TOWNSENDI.

	PAGE
Skull, from below, ♀ ad., $\times\frac{1}{1}$. Same skull as shown in Plate XIX . .	135



[illegible] Werner & Winter, Frankfurt a/M. lith.

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EXPLANATION OF PLATE XXI.

OTARIA BYRONIA.

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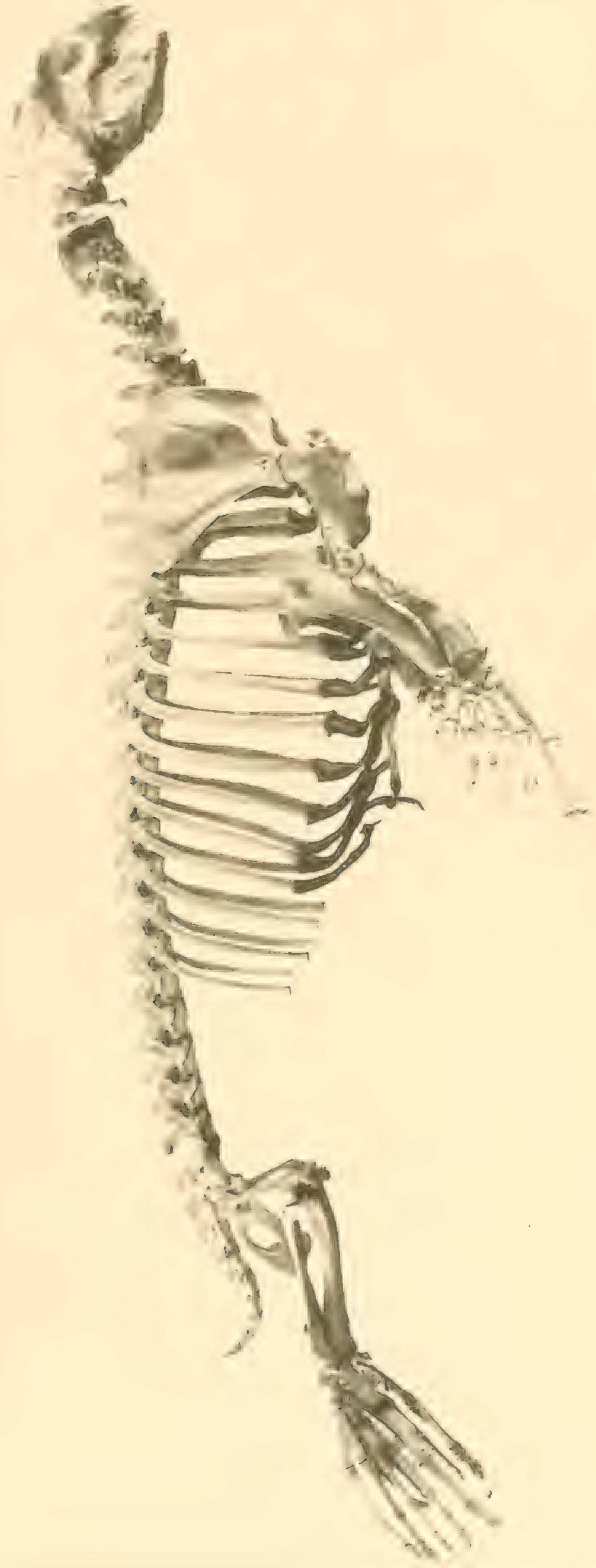
Skeleton, ♂ ad., × $\frac{1}{11}$. East coast of Patagonia. Princeton Museum .	105



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EXPLANATION OF PLATE XXII.

Conepatus humboldti.

		PAGE
Fig. 1–1*d*.	Skull, three views ($\times \frac{1}{1}$), and teeth ($\times \frac{2}{1}$), ♀ ad., teeth greatly worn. Rio Gallegos, Patagonia. U. S. Nat. Mus. No. 99,270.	144
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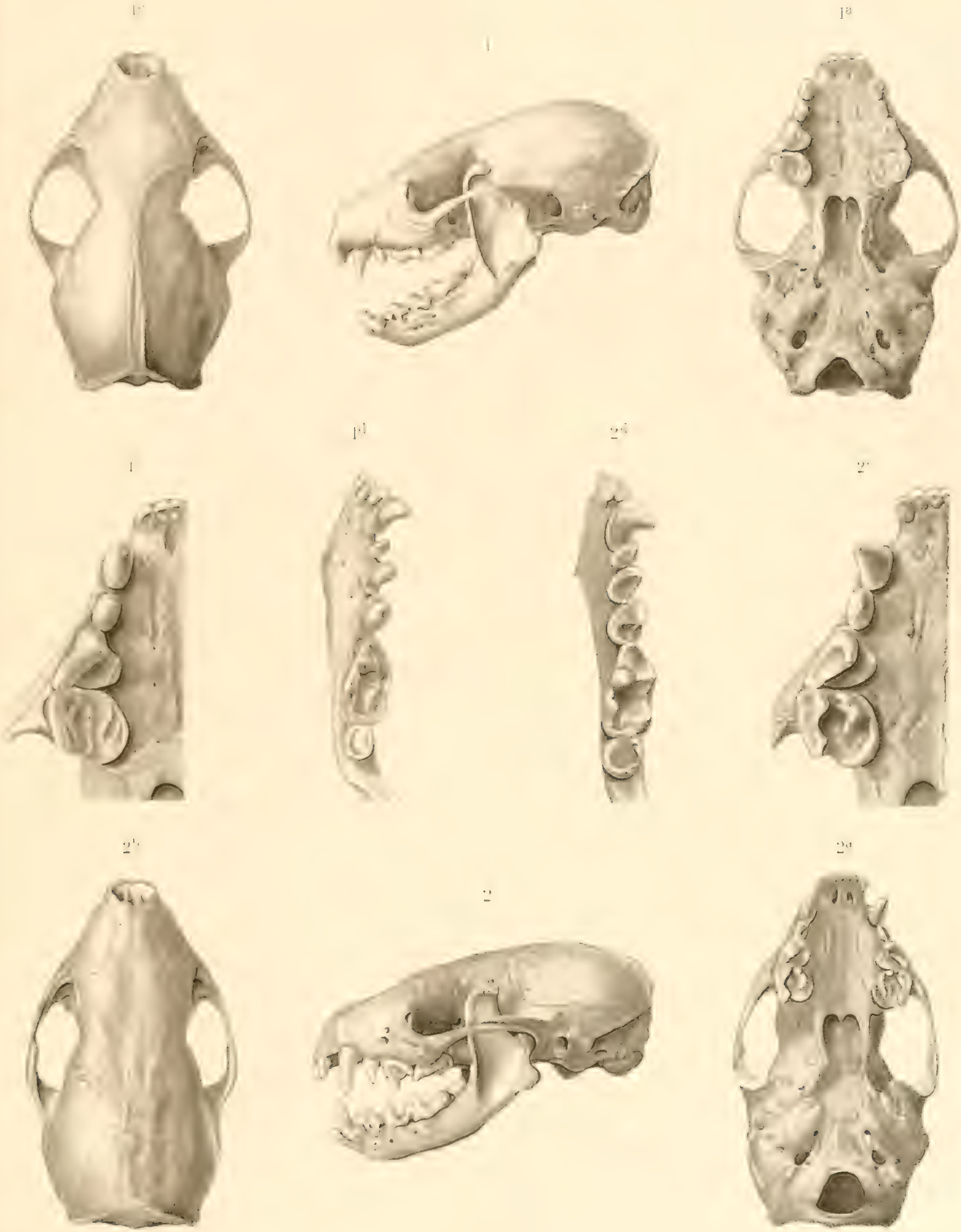
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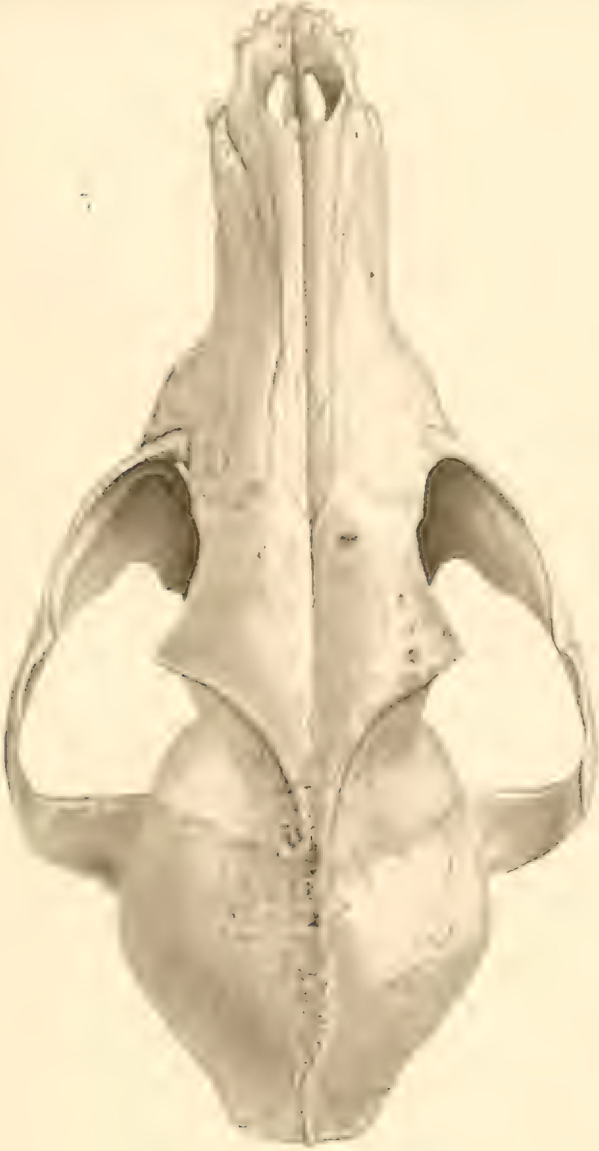
CONEPATUS HUMBOLDTI.

EXPLANATION OF PLATE XXIII.

CERDOCYON GRISEUS. = Dusicyon g. griseus.

	PAGE
Skull, three views, ♀ ad., × 1/1. Rio Coy, Patagonia. Am. Mus. No. 10,081.	155



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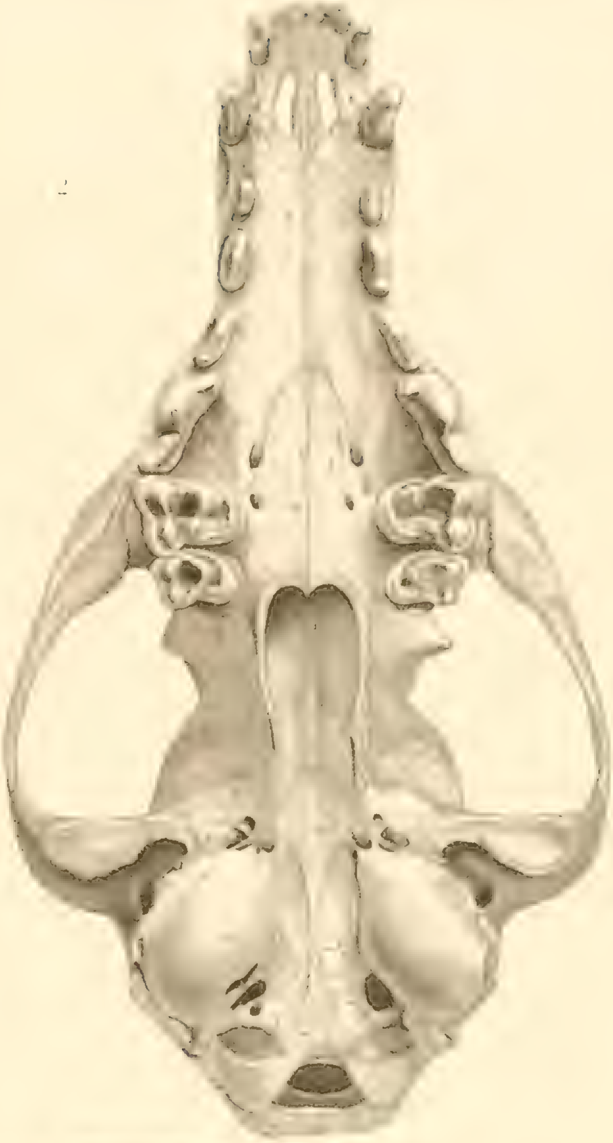

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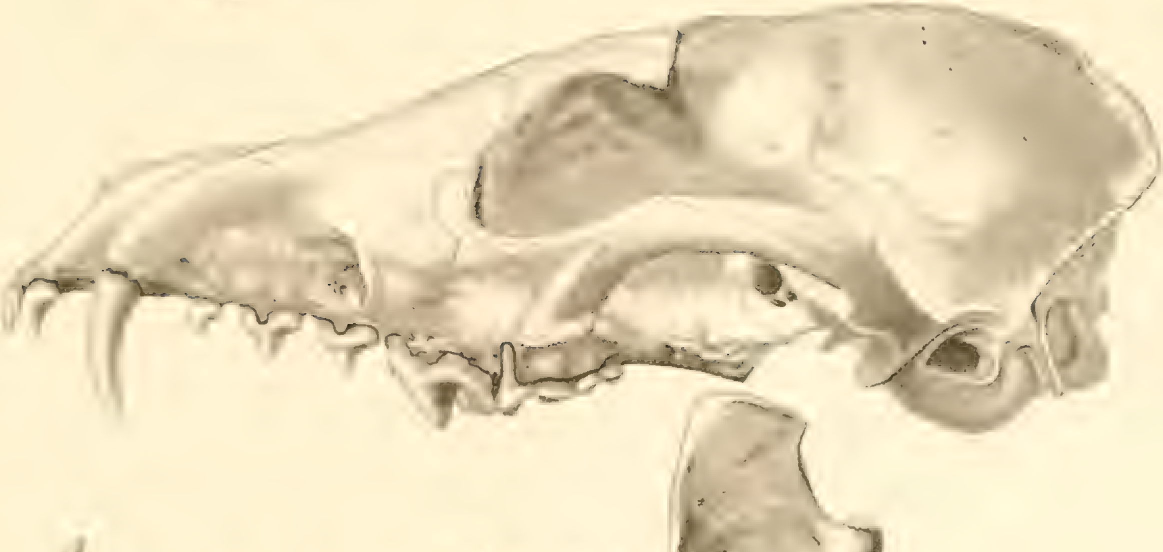


1

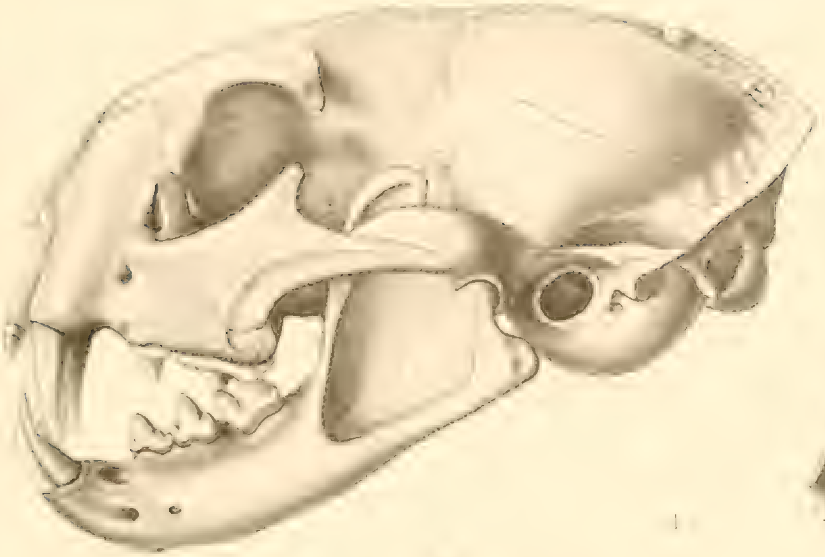
EXPLANATION OF PLATE XXIV.

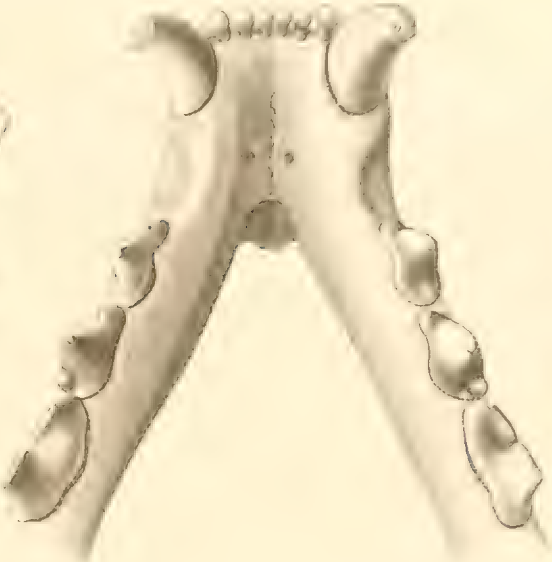
LYNCHAILURUS PAJEROS CRUCINA.

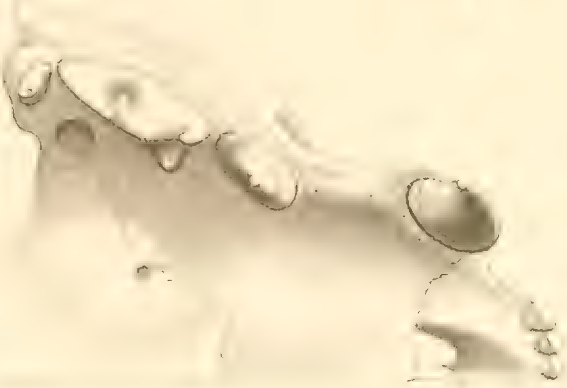
PAGE

Skull ($\times \frac{1}{1}$) and teeth ($\times \frac{2}{1}$), ♂ ad. Rio Gallegos, Patagonia. Am. Mus. No. 16,695. (*Felis pajeros crucina* on Plate.) 183

1







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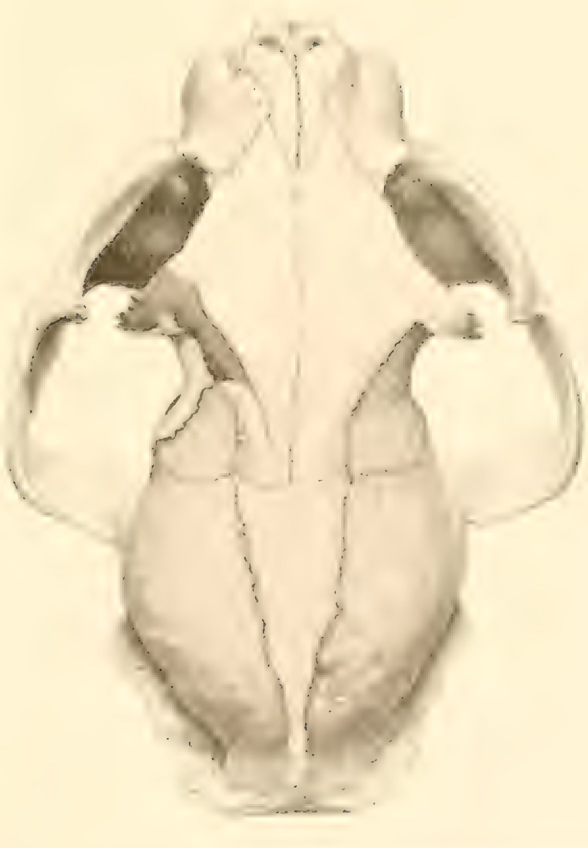

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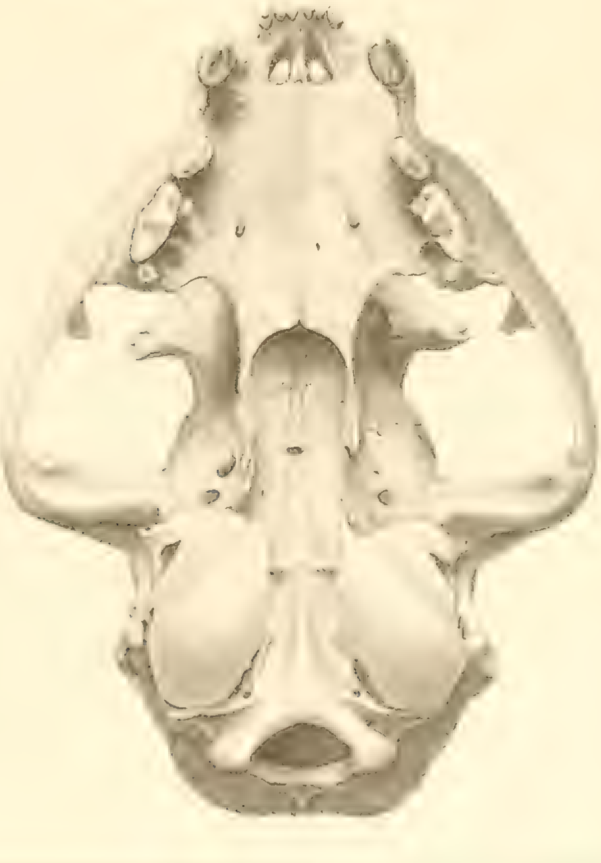
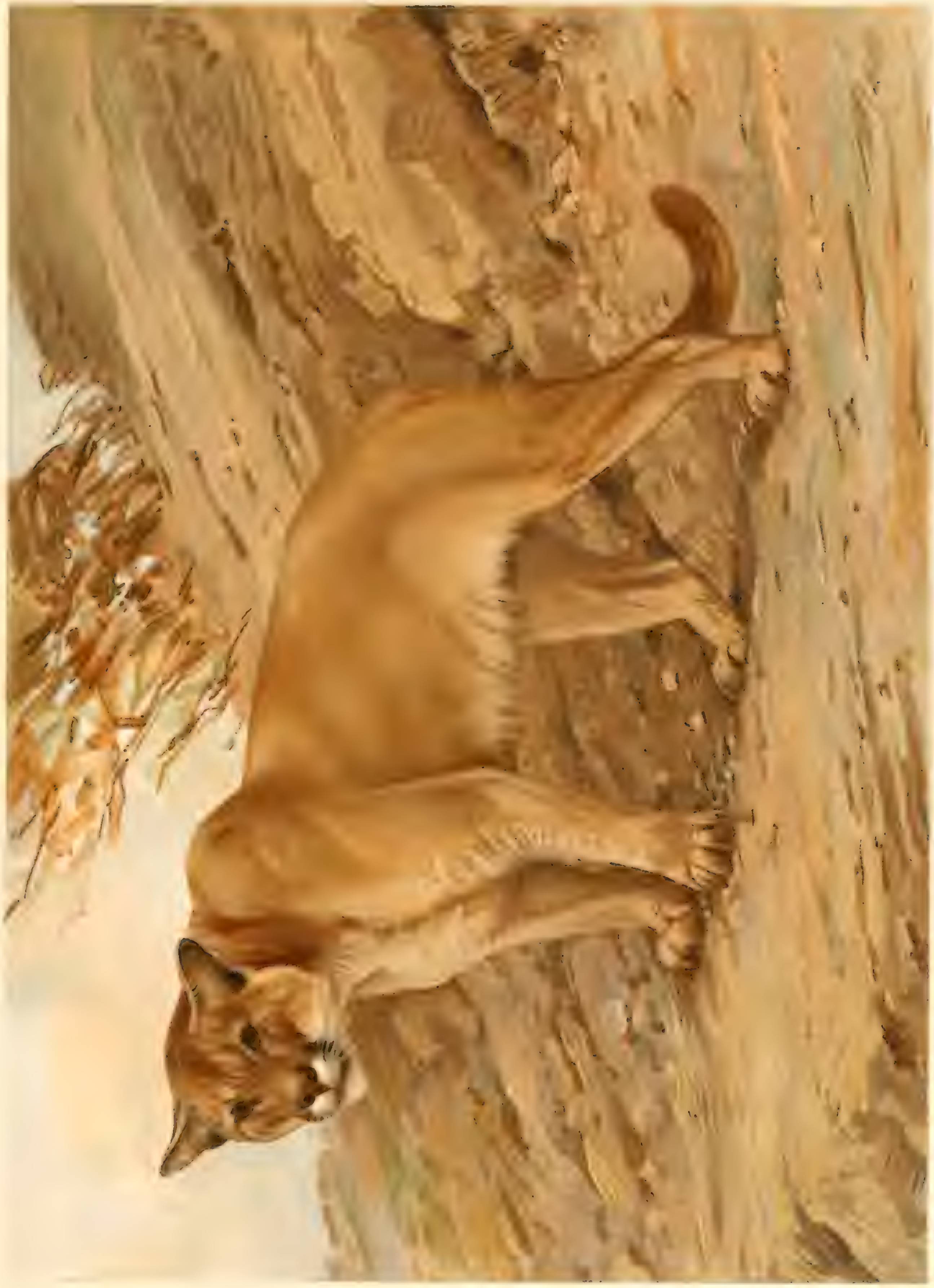


EXPLANATION OF PLATE XXV.

PUMA PEARSONI.

	PAGE
Animal, gray phase, ♀ ad. Rio Coy, Patagonia. Am. Mus. No. 17,434. (*Felis pearsoni* on Plate.)	175



[illegible] del. Werner & Winter, Frankfort a/M., lith.

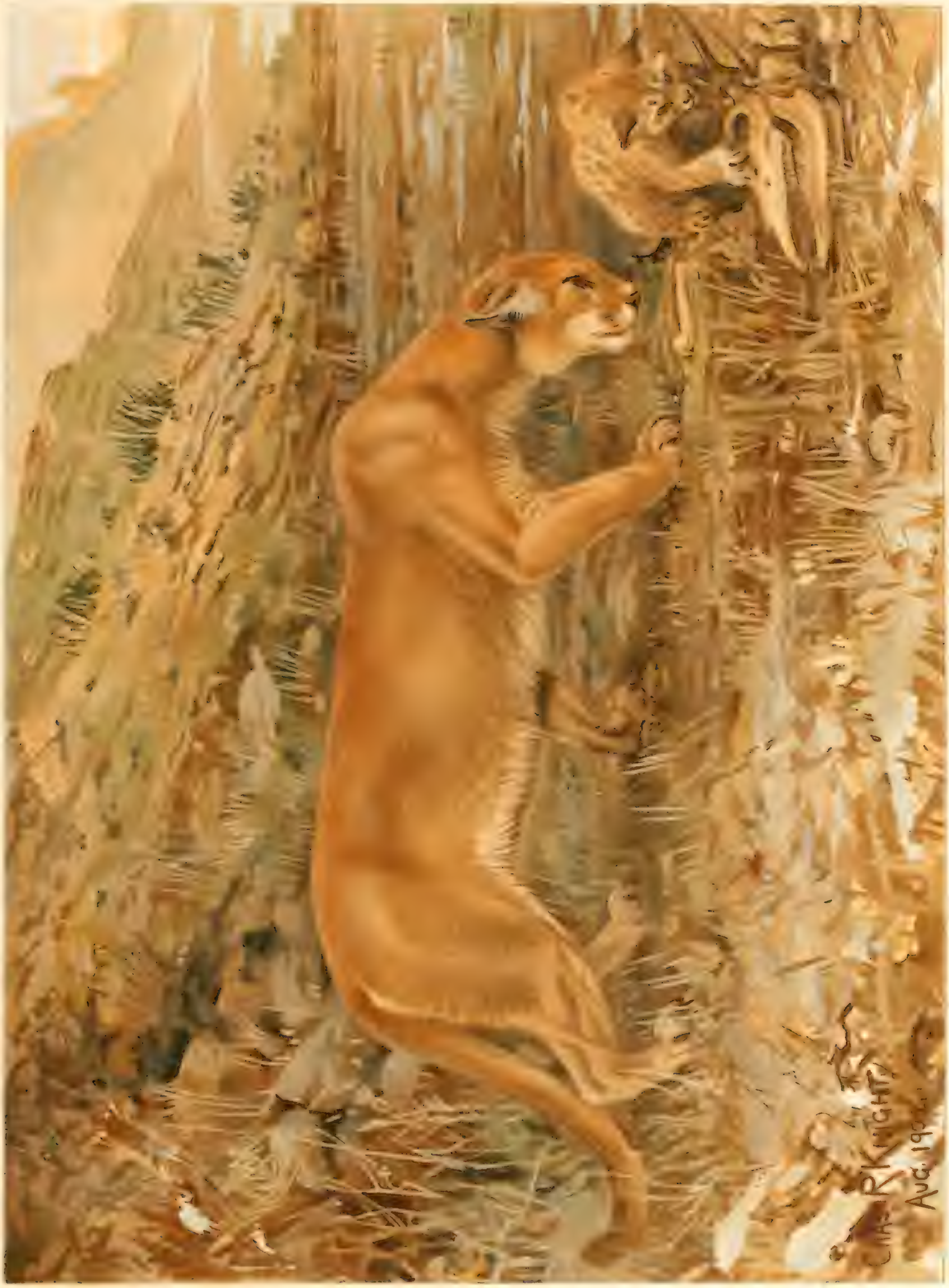
FELIS PEARSONI, (HOLMBERG).

EXPLANATION OF PLATE XXVI.

PUMA PEARSONI.

PAGE

Animal, red phase, female and young. Rio Coy, Patagonia. Am. Mus. No. 17,433, ♀ ad.; No. 17,435, young in spotted coat. (*Felis pearsoni* on Plate.) 174

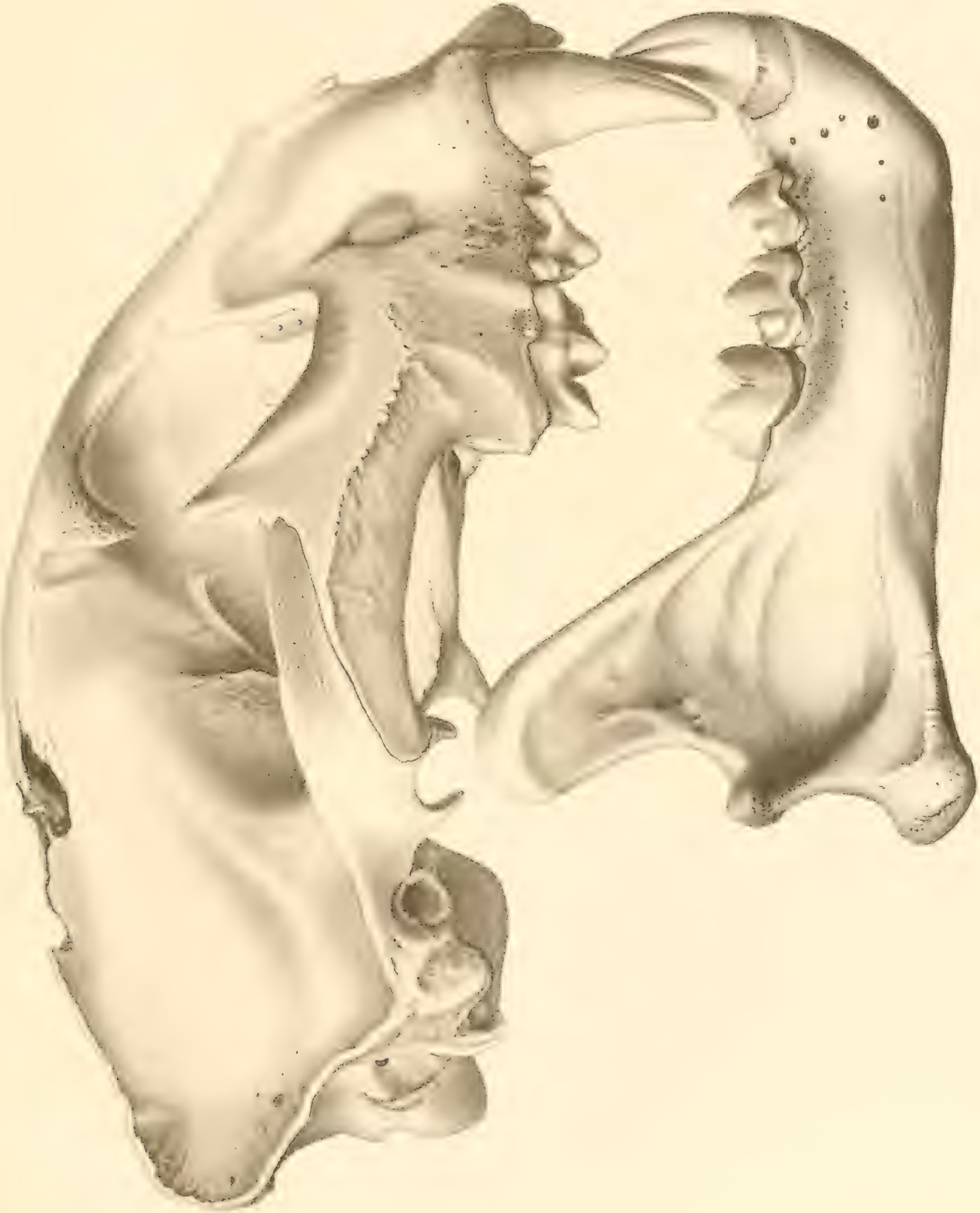

CHAS. R. KNIGHT
AUG. 1904

FELIS PEARSONI (PUMA)

EXPLANATION OF PLATE XXVII.

PUMA PEARSONI.

	PAGE
Skull, adult, Rio Coy, Patagonia. Am. Mus. No. 17,437. (*Felis pearsoni* on Plate.)	176

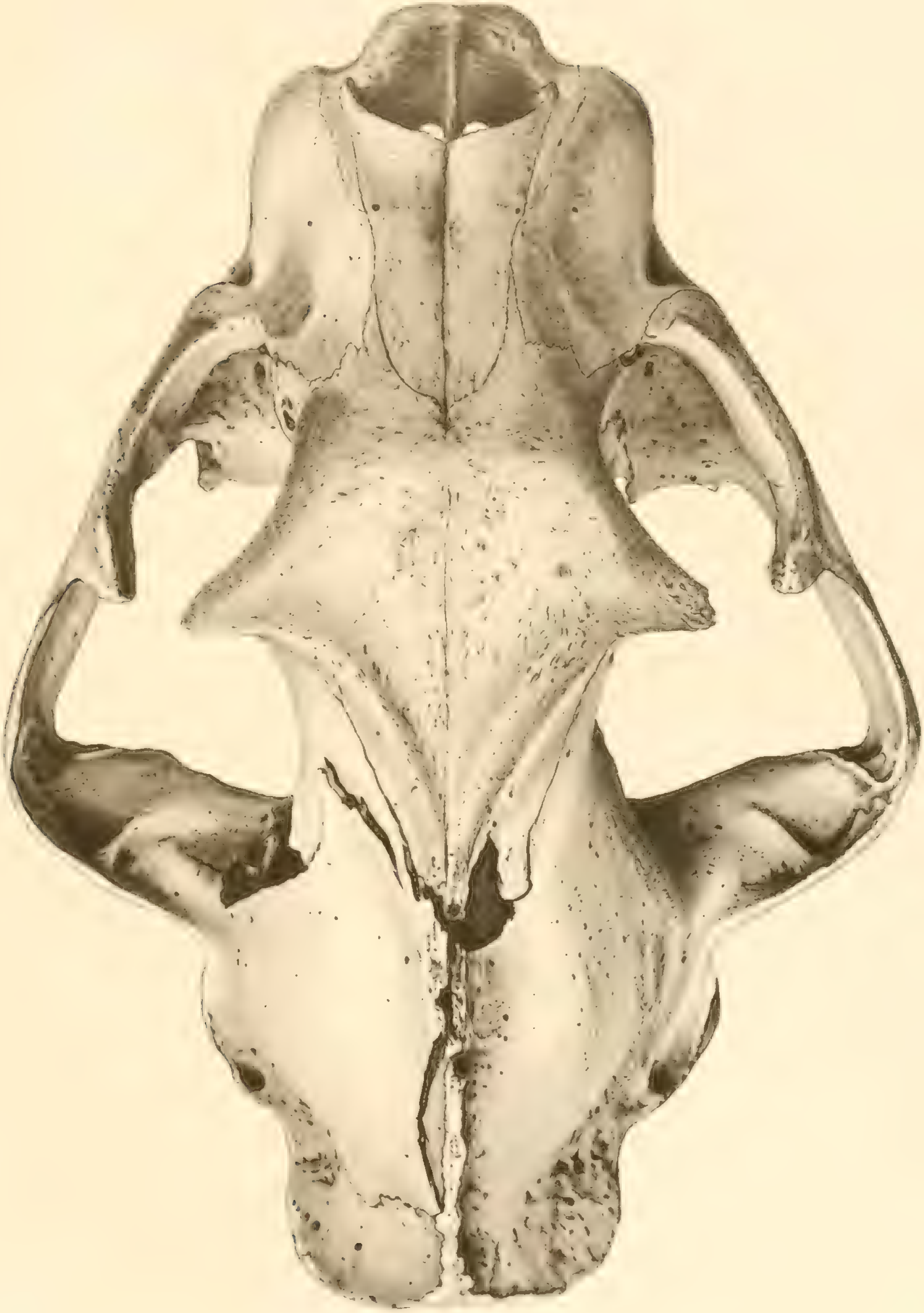


Werner & Winter, Frankfort a/M., lith.

EXPLANATION OF PLATE XXVIII.

PUMA PEARSONI.

	PAGE
Skull, same specimen as shown in Plates XXVII and XXIX. (*Felis pearsoni* on Plate.)	176

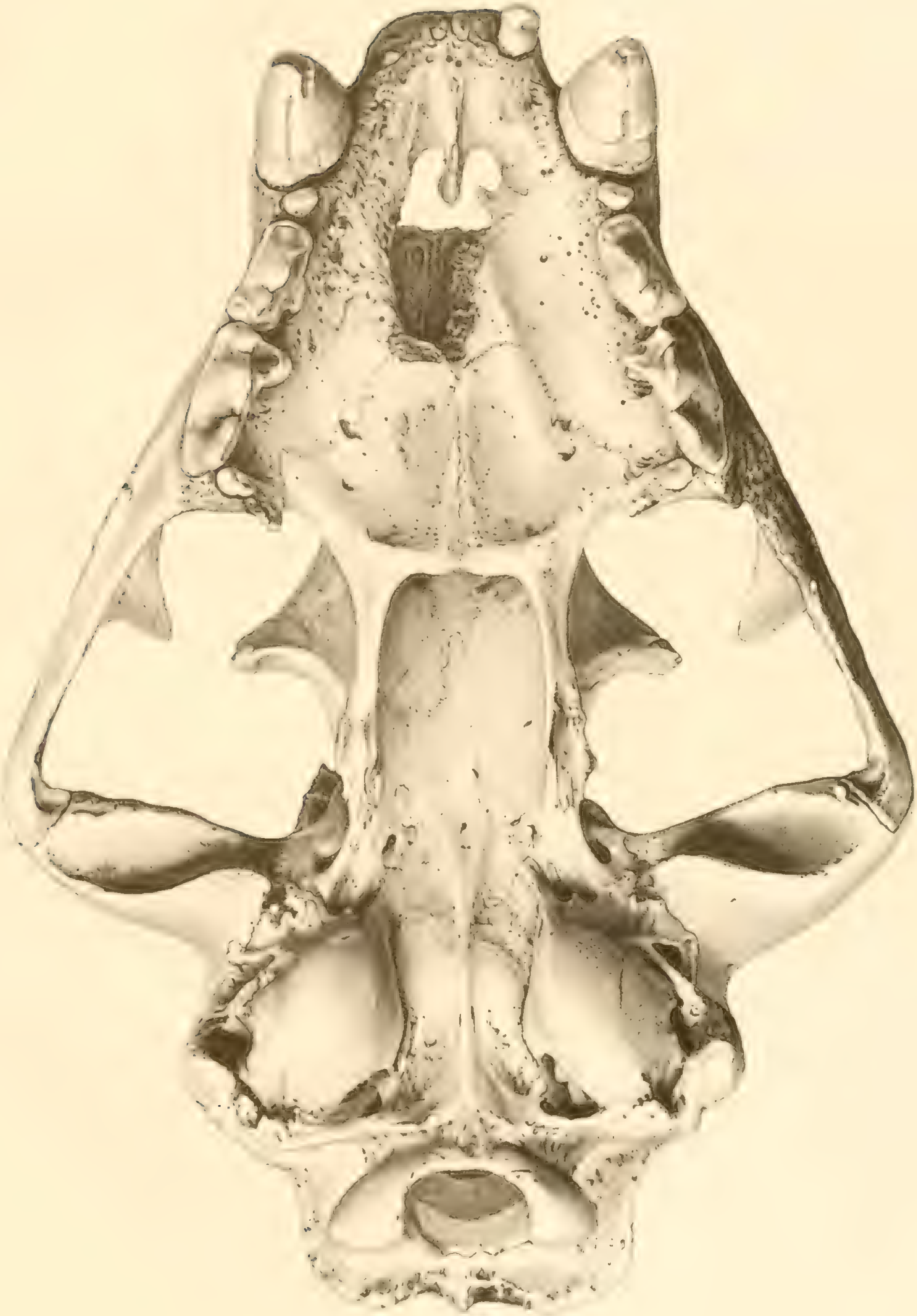


[illegible]

EXPLANATION OF PLATE XXIX.

Puma pearsoni.

	PAGE
Skull, same specimen as shown in Plates XXVII and XXVIII. (*Felis pearsoni* on Plate.)	176



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